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GLOSSARY OF TERMS IN SOIL SCIENCE

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Glossaire des termes de la science des sols.

INTRODUCTION

At its annual meeting in 1966, the Canadian Society of Soil Science (CSSS) formed a Nomenclature Committee whose task was to prepare a glossary of technical terms that are used in soil science in Canada. A preliminary edition of the glossary, based largely upon the glossary of the Soil Science Society of America (Soil Sci. Soc. Am. Proc. 29:330-351), was printed in English as Part II of the Proceedings of the CSSS, 1967. The present glossary contains some additional terms and some revised definitions. It is published by the Research Branch of the Canada Department of Agriculture in English and French. In the English edition the French equivalents follow the English terms; for example, **absorbed water** *eau absorbée*. In the French edition the English equivalents follow the French terms.

This glossary is not complete and revisions will be required if it is to remain useful. We urge all users of the glossary to suggest improvements in the present definitions and to submit definitions of other terms that should be included. We thank the many people who contributed to this glossary and those who prepared the French translation. We would like to suggest the following additional sources of definitions:

American Society of Agricultural Engineers. 1967. Glossary of soil and water terms. Special Publication SP-04-67. St. Joseph, Michigan.

American Geological Institute. 1962. Dictionary of geological terms. Doubleday and Co. Inc., Garden City, New York.

American Society for Testing and Materials. 1970. Standard definitions of terms and symbols relating to soil and rock mechanics. *In* Annual book of ASTM standards. ASTM Designation D653-67.

Baulig, H. 1956. Vocabulaire franco-anglo-allemand de géomorphologie. University of Strasbourg.

Duchauffour, P. 1965. Précis de pédologie. Masson, Paris.

Jacks, G. V., Tavernier, R., and Boalch, D. H. (Editors). 1960. Multilingual vocabulary of soil science. FAO, Rome.

Lozet, J. 1956. Dictionnaire de pédologie. Ministère des Colonies, Bruxelles.

Organizing Committee of the VIIIth International Congress of Soil Science (Editors). 1964. Soil science dictionary. Bucharest, Rumania.

Plaisance, G., and Cailleux, A. 1958. Dictionnaire des sols. La Maison Rustique, Paris.

Soil Science Society of America. 1965. Glossary of soil science terms. Proc. 29:330-351. Madison, Wisconsin.

The members of the Nomenclature Committee of the CSSS were: B. Bernier, F. D. Cook, W. A. Ehrlich, G. J. Ouellette, E. A. Paul, E. Penner, R. J. Soper, and J. A. McKeague (Chairman).

The French terms were translated by: R. Baril, B. Bernier, G. A. Bourbeau, S. J. Bourget, M. Cescas, R. Héroux, and L. J. O'Grady.

ORDER OF ENTRY

The terms have been entered in alphabetical order. If the term consists of more than one word, the modifier, except the word soil, has been put first in most cases; for example: absorbed water, apparent density, and bulk volume. When soil is the modifier, it has been entered as the last word; for example: aeration, soil; amendment, soil; and type, soil.

A horizon *horizon A* See **horizon, soil.**

ablation till *till d'ablation* A surface deposit of loose, permeable, somewhat stratified, sandy, and stony till overlying denser till.

absorbed water *eau absorbée* Water held mechanically in a soil mass and having physical properties similar to ordinary water at the same temperature and pressure.

accelerated erosion *érosion accélérée* See **erosion** (ii).

acid soil *sol acide* A soil material having a pH of less than 7.0. See also **reaction, soil.**

actinomycetes *actinomycètes* Unicellular filamentous microorganisms that branch monopodially or more rarely dichotomously and form radiating colonies; mainly found in the soil, and cause of its characteristic odor.

active acidity *acidité active* The activity of hydrogen ion in the aqueous phase of a soil. It is measured and expressed as a pH value.

adaptation *adaptation* Change in an organism resulting from the action of natural selection on variation so that the organism is fitted more perfectly for existence in its environment.

adaptive enzyme *enzyme d'induction* An enzyme produced by an organism in response to the presence of its substrate or a related substance. It is also called an induced enzyme.

adsorbed water *eau adsorbée* Water held in a soil mass by physicochemical forces and having physical properties substantially different from absorbed water or chemically combined water at the same temperature and pressure.

adsorption complex *complexe d'adsorption* The group of substances in the soil capable of adsorbing other materials. Organic and inorganic colloidal substances form the greater part of the adsorption complex. The noncolloidal materials, such as silt and sand, exhibit adsorption to a much lesser extent than the colloidal materials.

aerate *aérer* To impregnate with a gas, usually air.

aeration, soil *aération du sol* The process by which air in the soil is replaced by air from the atmosphere. In a well-aerated soil, the soil air is similar in composition to the atmosphere above the soil. Poorly aerated soils usually contain a much higher percentage of carbon dioxide and a correspondingly lower percentage of oxygen than the atmosphere. The rate of aeration depends largely on the volume and continuity of pores in the soil.

aerobic *aérobie* (i) Having molecular oxygen as a part of the environment. (ii) Growing only in the presence of molecular oxygen, such as aerobic organisms. (iii) Occurring only in the presence of molecular oxygen, as applied to certain chemical or biochemical processes such as aerobic decomposition.

aggradation *colmatage* Filling in or leveling by deposition.

aggregate *agrégat* A group of soil particles cohering in such a way that they behave mechanically as a unit.

agronomy *agronomie* The branch of agriculture that deals with the theory and practice of field-crop production and the scientific management of soil.

air-dry *séché à l'air* (i) The state of dryness of a soil at equilibrium with the moisture content of the surrounding atmosphere. The moisture content depends on the relative humidity and the temperature of the surrounding atmosphere. (ii) To allow to reach equilibrium in moisture content with the surrounding atmosphere.

air porosity *porosité en air* The portion of the bulk volume of soil that is filled with air at any given time or under a given condition such as a specified soil water potential. Usually, this portion is made up of large pores, that is those drained by a tension of less than about 100 cm (39.4 inches) of water. See also **moisture tension, soil.**

air, soil *atmosphère du sol, air du sol* The soil atmosphere, the gaseous phase of the soil, is the volume not occupied by solid or liquid.

alkali soil *sol à alcalis* (i) A soil having a high degree of alkalinity (pH of 8.5 or higher), or having a high exchangeable sodium content (15% or more of the exchange capacity), or both. (ii) A soil that contains enough alkali (sodium) to interfere with the growth of most crop plants. See also **saline–alkali soil** and **sodic soil.**

alkaline soil *sol alcalin* Any soil that has a pH greater than 7.0. See also **reaction, soil.**

alkalinity, soil *alcalinité du sol* The degree or intensity of alkalinity of a soil expressed by a value greater than 7.0 on the pH scale.

alkalization *alcalisation* The process whereby the exchangeable sodium content of a soil is increased.

allophane *allophane* An amorphous hydrated aluminosilicate of variable composition.

alluvial fan *cône de déjection* A fan-shaped deposit of alluvium laid down by a stream where it emerges from an upland into less steeply sloping terrain.

alluvium *alluvion* Material such as clay, silt, sand, and gravel deposited by modern rivers and streams.

alpine soil *sol alpin* Mountain soil occurring above the timberline.

amendment, soil *amendement du sol* (i) An alteration of the properties of a soil, and thereby of the soil, by the addition of substances such as lime, gypsum, and sawdust to make the soil more suitable for the growth of plants. (ii) Any substance used for this purpose. Fertilizers constitute a special group of soil amendments.

amino acid *acide aminé* An organic acid containing both amino (NH_2) and carboxyl (COOH) groups, and usually having the general formula

$$R{-}\underset{\displaystyle NH_2}{\underset{|}{CH}}{-}COOH$$

ammonification *ammonification* The biochemical process whereby ammoniacal nitrogen is released from nitrogen-containing organic compounds.

ammonium fixation *fixation d'ammonium* The adsorption or absorption of ammonium ions by the mineral or organic fractions of the soil in such a way that the ions are relatively insoluble in water and relatively unexchangeable by the usual methods of cation exchange.

amorphous mineral *minéral amorphe* (i) A mineral that has no definite crystalline structure. (ii) A mineral that has a definite crystalline structure, but appears amorphous because of the small crystallite size.

anaerobic *anaérobie* (i) Having no molecular oxygen in the environment. (ii) Growing in the absence of molecular oxygen, such as anaerobic bacteria. (iii) Occurring in the absence of molecular oxygen, as in a biochemical process.

angular cobbly *caillouteux (anguleux)* A descriptive term applied to coarse fragments. It is used for irregular and angular rock or mineral particles 7.5 to 25 cm (3 to 10 inches) in diameter. See also **coarse fragments.**

anion exchange capacity *capacité d'échange anionique* The total amount of exchangeable anions that a soil can adsorb. It is expressed as milliequivalents per 100 g of soil or other adsorbing material such as clay.

anisotropic mass *masse anisotrope* A mass whose properties

have different values when they are measured in different directions at any given point.

antagonism *antagonisme* The mutual killing, injury, or inhibition of growth of dissimilar organisms occupying the same ecological niche.

antibiotic *antibiotique* A substance that is produced by a species of microorganism and, in dilute solution, has the capacity to inhibit the growth of or kill certain other organisms.

apparent density *densité apparente* See **bulk density, soil.**

apparent specific gravity *poids spécifique apparent* See **bulk specific gravity.**

arable soil *sol arable* Soil suitable for plowing and cultivation.

arthropod *arthropode* A jointed-legged invertebrate, such as an insect or a crustacean.

artificial manure *fumier artificiel, engrais* See **compost.** In European usage artificial manure may denote commercial fertilizers.

associate, soil *sol d'association* A nontaxonomic but cartographic grouping of soils or land segments, which combines related soils into units having similarity in geomorphic position, landform, edaphic and mechanical properties of soils (climate, drainage, particle size, etc.), and to some degree similarity in the geological nature of the soil materials and taxonomic classes.

association, soil *association de sols* A natural grouping of soil associates based on similarities in climatic or physiographic factors and soil parent materials. It may include a number of soil associates provided that they are all present in significant proportions.

Atterberg limits *limites d'Atterberg* See **liquid limit** and **plastic limit.**

auger, soil *tarière* A tool for boring into the soil and withdrawing a small sample for observation in the field or laboratory. The different kinds of augers include those having worm-type bits, unenclosed; those having worm-type bits enclosed in a hollow cylinder; and those having a hollow half-cylinder with cutting edge on the side that rotates around a stabilizing vane.

autotrophic *autotrophe* Capable of utilizing inorganic carbon as the main source of carbon and of obtaining energy for life processes from the oxidation of inorganic elements (chemotrophic) or from radiant energy (phototrophic).

available nutrient *élément nutritif assimilable* The portion of any element or compound in the soil that can be readily absorbed and assimilated by growing plants. ("Available" should not be confused with "exchangeable.")

available water *eau disponible* The portion of water in a soil that can be readily absorbed by plant roots. Most workers consider it to be the water held in the soil against a pressure of up to approximately 15 bars. See also **field capacity** and **moisture tension, soil.**

azonal soil *sol azonal* Soil without distinct genetic horizons. Such soils may have non-Chernozemic Ah horizons, or thin Chernozemic Ah horizons, but lack B horizons. In Canada they are included with Regosolic soils.

B horizon *horizon B* See **horizon, soil.**

bacteriophage *bactériophage* A virus that infects bacteria and causes lysis of bacterial cells.

badland *badland* A land type generally devoid of vegetation and broken by an intricate maze of narrow ravines, sharp crests, and pinnacles resulting from serious erosion of soft geologic materials. This type is most common in arid or semiarid regions. It is a miscellaneous land type.

bar *bar* A unit of pressure equal to one million dynes per square centimetre.

base course (base) *assise* A layer of specified or selected material of planned thickness constructed on the subgrade or subbase for distributing load, providing drainage, or minimizing frost action, and other such purposes.

base saturation percentage *pourcentage, taux de saturation en bases* The extent to which the adsorption complex of a soil is saturated with exchangeable cations other than hydrogen and aluminum. It is expressed as a percentage of the total cation exchange capacity.

beach deposits *dépôts de plage* Sediments that are modified in their degree of sorting, or surface relief, or both, by the action of waves in forming beaches.

bearing capacity *capacité portante, capacité de charge* The average load per unit area that is required to rupture a supporting soil mass.

bed *lit* A unit layer 1 cm (0.4 inch) or more thick that is visually or physically more or less distinctly separable from other layers above and below in a stratified sequence.

bedrock *assise rocheuse, roc sous-jacent, roc* The solid rock that underlies soil and the regolith or that is exposed at the surface.

bench terrace *terrasse en gradins* See **terrace.**

biosequence *bioséquence* A sequence of related soils that differ from one another primarily in the kinds and numbers of soil organisms that play a part in soil formation.

bisect *bisect* A profile of plants and soil showing the vertical and lateral distribution of roots and tops in their natural position.

bisequa *bisequums* Two sequa in one soil; that is, two sequences of an eluvial horizon and its related illuvial horizon.

Black *noir* A great group of soils in the Chernozemic order. The soils occur in the cool to cold subhumid grassland and parkland regions. They have a very dark surface (Ah or Ap) horizon and ordinarily a brownish B (Bm, Btj, or Bt) horizon, which may be absent, over a highly base-saturated, usually calcareous C horizon.

blocky *polyédrique* See **structure types, soil.**

blowing sand *sable poudreux* Sandy material that is or has been subjected to wind action.

blown-out land *terrain de déflation* An area from which all or almost all the soil and soil material have been removed by wind erosion. It is usually a barren, shallow depression that has a flat or irregular floor consisting of a rather resistant layer or an accumulation of pebbles or both, or a wet zone immediately above a water table. The land is usually unfit for crop production. It is a miscellaneous land type.

blowout *cuvette de déflation* A small area from which soil material has been removed by wind.

bog *tourbière* Permanently wet land having low bearing strength.

bog iron *fer des marais* Impure iron deposits that develop in bogs or swamps by the chemical or biochemical oxidation of iron carried in solution.

border-strip irrigation *irrigation par calants, irrigation à la planche* See **irrigation methods.**

bottomland *bas-fond, pré inondable* See **floodplain.**

boulders *blocs rocheux, blocs* Rock fragments over 60 cm (2 ft) in diameter. See also **coarse fragments.** In engineering practice boulders are greater than 20 cm (8 inches) in diameter.

breccia *brèche* A rock composed of coarse angular fragments cemented in a fine-grained matrix.

Brown *brun* A great group of soils in the Chernozemic order. The soils occur in the cool, subarid to semiarid grassland regions, and consist of a brown (dry) surface (Ah or Ap) horizon and ordinarily a lighter-colored brownish B (Bm, Btj, or Bt) horizon, which may be absent, over a highly base-saturated, usually calcareous, C horizon.

Brunisolic *brunisolique* An order of soils whose horizons are developed sufficiently to exclude the soils from the Regosolic order, but that lack the degrees or kinds of horizon development specified for soils of the other orders. These soils, which occur under a wide variety of climatic and vegetative conditions, all have Bm or Btj horizons. The great groups Melanic Brunisol, Eutric Brunisol, Sombric Brunisol, and Dystric Brunisol belong to this order.

buffer compounds, soil *complexe tampon* The clay, organic matter, and materials such as carbonates and phosphates that enable the soil to resist appreciable change in pH.

bulk density, soil *densité apparente* The mass of dry soil per unit bulk volume. The bulk volume is determined before the soil is dried to constant weight at 105 °C. It has been called apparent density.

bulk specific gravity *poids spécifique apparent* The ratio of the bulk density of a soil to the mass of a unit volume of water. (It is also called apparent specific gravity.)

bulk volume *volume brut* The volume, including the solids and the pores, of an arbitrary soil mass.

buried soil *sol fossile, sol enfoui* Soil covered by an alluvial, loessial, or other deposit, usually to a depth greater than the thickness of the solum.

butte *butte* An isolated hill rising abruptly above the surrounding area and having steep sides and a flat top. Most of the top has been removed by erosion, and it has a smaller summit area than a mesa.

C

C horizon *horizon C* See **horizon, soil.**

calcareous soil *sol calcaire* Soil containing sufficient calcium carbonate, often with magnesium carbonate, to effervesce visibly when treated with cold 0.1 N hydrochloric acid.

calciphytes *calciphytes* Plants that require or tolerate rather large amounts of calcium or are associated with soils rich in calcium.

caliche *caliche* (i) A layer near the surface, more or less cemented by secondary carbonates of calcium or magnesium precipitated from the soil solution. It may be a soft thin soil horizon, a hard thick bed just beneath the solum, or a surface layer exposed by erosion. It is not a geologic deposit. (ii) Alluvium cemented with sodium nitrate, sodium chloride, or other soluble salts in the nitrate deposits of Chile and Peru.

capability class *classe de possibilités* A rating that indicates the capability of land for some use such as agriculture, forestry, recreation, or wildlife. In the Canadian system, it is a grouping of lands that have the same relative degree of limitation or hazard. The degree of limitation or hazard is nil in Class 1 and becomes progressively greater to Class 7.

capability subclass *sous-classe de possibilités* A grouping of lands that have similar kinds of limitations and hazards. It provides information on the kind of conservation problem or limitation. The class and subclass together provide information about the degree and kind of limitation, for broad land-use planning and for the assessment of conservation needs.

capillary conductivity *conductivité capillaire* (Obsolete) See **water, soil: hydraulic conductivity.**

capillary fringe *frange capillaire* A zone of essentially saturated soil just above the water table. The size distribution of the pores determines the extent and degree of the capillary fringe.

capillary porosity *porosité capillaire* (Obsolete) The small pores or the bulk volume of small pores that hold water in soils against a tension usually greater than 60 cm (24 inches) of water. See also **moisture tension, soil.**

capillary potential *potentiel capillaire* See **water, soil: matric potential (capillary potential).**

capillary water *eau capillaire* (Obsolete) The water held in the small pores of a soil, usually with a tension greater than 60 cm (24 inches) of water. See also **moisture tension, soil.**

carbon cycle *cycle du carbone* The cycle whereby carbon dioxide is fixed in living organisms by photosynthesis or by chemosynthesis, is consumed in carbohydrate, protein, and fat by most animals and plants that do not carry out photosynthesis, and ultimately is returned to its original state when it is freed by respiration and by the death and decay of plant and animal bodies.

carbon–nitrogen ratio *rapport carbone/azote* The ratio of the weight of organic carbon to the weight of total nitrogen in a soil or in an organic material. It is obtained by dividing the percentage of organic carbon (C) by the percentage of total nitrogen (N).

category *catégorie* A grouping of related soils defined at approximately the same level of abstraction. In the Canadian classification the categories are order, great group, subgroup, family, and series.

catena *caténa, chaîne de sols* A nontaxonomic grouping of a sequence of soils of about the same age, derived from similar parent materials, and occurring under similar climatic conditions, but having unlike characteristics because of variations in relief and in drainage.

cation exchange *échange cationique* The interchange of a cation in solution and another cation on the surface of any surface-active material such as clay colloid or organic colloid.

cation exchange capacity *capacité d'échange cationique* The total amount of exchangeable cations that a soil can adsorb. It is sometimes called "total exchange capacity," "base exchange capacity," or "cation adsorption capacity." It is expressed in milliequivalents per 100 g of soil or of other adsorbing materials such as clay. See also **effective cation exchange capacity** and **pH-dependent cation exchange capacity.**

cemented-indurated *cimenté (induré)* Having a hard, brittle consistence because the particles are held together by cementing substances such as humus, calcium carbonate, or the oxides of silicon, iron, and aluminum. The hardness and brittleness persist even when the soil is wet. See also **indurated layer.**

channery *en plaquettes* A descriptive term used for thin and flat limestone, sandstone, or schist fragments up to 15 cm (6 inches) in length. See also **coarse fragments.**

check-basin irrigation *irrigation par bassin de retenue* See **irrigation methods.**

chemistry, soil *chimie du sol* The division of soil science dealing with the chemical constitution, properties, and reactions of soils.

Chernozemic *chernozémique* An order of soils that have developed under xerophytic or mesophytic grasses and forbs, or under grassland–forest transition vegetation, in cool to cold, subarid to subhumid climates. The soils have a dark-colored surface (Ah, Ahe, or Ap) horizon and a B or C horizon, or both, of high base saturation. The order consists of the Brown, Dark Brown, Black, and Dark Gray great groups.

chisel, subsoil *sous-soleuse* A tillage implement having one or more cultivator-type feet to which are attached strong knife-like tools that are used to shatter or loosen hard, compact layers, usually in the subsoil, to depths below normal plow depth. See also **subsoiling.**

chiseling *sous-solage* See **subsoiling.**

chitin *chitine* A nitrogen-containing polysaccharide present in the covering layer of insects and in the cell walls of many fungi.

chlorite group *groupe des chlorites* A group of nonexpanding platy clay minerals, similar chemically to the vermiculite group, but having a single hydroxide layer between the sheets in place of the exchangeable cations and water.

chroma *saturation, pureté* The relative purity, strength, or saturation of a color. It is directly related to the dominance of the determining wavelength of light. It is one of the three variables of color. See also **Munsell color system; hue;** and **value, color.**

chronosequence *chronoséquence* A sequence of related soils that differ from one another in certain properties primarily as a result of time as a soil-forming factor.

class, soil *classe de sols* A group of soils having a definite range in a particular property such as acidity, degree of slope, texture, structure, land-use capability, degree of erosion, or drainage. See also **structure, soil** and **texture, soil.**

classification, soil *classification des sols* The systematic arrangement of soils into categories on the basis of their characteristics. Broad groupings are made on the basis of general characteristics, and subdivisions on the basis of more detailed differences in specific properties.

The system of soil classification for Canada at the order, great group, and subgroup levels is listed in Table 1 in numerical

sequence for the purposes of identification and coding. From the left side, the first number is the order, the second the great group, the third and fourth the subgroup, and the fifth the subgroup modifier. The subgroup modifiers may be appended to any subgroup permitted by the current system of soil classification for Canada.

Table 1. Soil classification at levels of order, great group, and subgroup

Order	Great Group	Subgroup*	Subgroup Modifier*
1 Chernozemic	11 Brown	1101 Orthic Brown	2 Grumic
		1102 Rego Brown	5 Saline
		1103 Calcareous Brown	6 Carbonated
		1104 Eluviated Brown	8 Gleyed
		1105 Solonetzic Brown	9 Lithic
		1106 Solodic Brown	
	12 Dark Brown	1201 Orthic Dark Brown	2 Grumic
		1202 Rego Dark Brown	5 Saline
		1203 Calcareous Dark Brown	6 Carbonated
		1204 Eluviated Dark Brown	8 Gleyed
		1205 Solonetzic Dark Brown	9 Lithic
		1206 Solodic Dark Brown	
	13 Black	1301 Orthic Black	2 Grumic
		1302 Rego Black	5 Saline
		1303 Calcareous Black	6 Carbonated
		1304 Eluviated Black	8 Gleyed
		1305 Solonetzic Black	9 Lithic
		1306 Solodic Black	
	14 Dark Gray	1401 Orthic Dark Gray	2 Grumic
		1402 Rego Dark Gray	5 Saline
		1403 Calcareous Dark Gray	6 Carbonated
		1405 Solonetzic Dark Gray	8 Gleyed
		1406 Solodic Dark Gray	9 Lithic
2 Solonetzic	21 Solonetz	2101 Brown Solonetz	8 Gleyed
		2102 Dark Brown Solonetz	9 Lithic
		2103 Black Solonetz	
		2104 Gray Solonetz	
		2105 Alkaline Solonetz	
	22 Solodized Solonetz	2201 Brown Solodized Solonetz	8 Gleyed
		2202 Dark Brown Solodized Solonetz	9 Lithic
		2203 Black Solodized Solonetz	
		2204 Gray Solodized Solonetz	
	23 Solod	2301 Brown Solod	8 Gleyed
		2302 Dark Brown Solod	9 Lithic
		2303 Black Solod	
		2304 Gray Solod	
3 Luvisolic	31 Gray Brown Luvisol	3101 Orthic Gray Brown Luvisol	8 Gleyed
		3102 Brunisolic Gray Brown Luvisol	9 Lithic
		3103 Podzolic Gray Brown Luvisol	
	32 Gray Luvisol	3201 Orthic Gray Luvisol	3 Turbic
		3202 Dark Gray Luvisol	7 Cryic
		3203 Brunisolic Gray Luvisol	8 Gleyed
		3204 Podzolic Gray Luvisol	9 Lithic
		3205 Solodic Gray Luvisol	
		3206 Solodic Dark Gray Luvisol	

*Tentative numbering system, not adopted by Canada Soil Survey Committee.

C

Table 1 (continued)

Order	Great Group	Subgroup	Subgroup Modifier
4 Podzolic	41 Humic Podzol	4101 Orthic Humic Podzol 4102 Ortstein Humic Podzol 4103 Placic Humic Podzol 4104 Duric Humic Podzol 4105 Fragic Humic Podzol	8 Gleyed 9 Lithic
	42 Ferro-Humic Podzol	4201 Orthic Ferro-Humic Podzol 4202 Ortstein Ferro-Humic Podzol 4203 Placic Ferro-Humic Podzol 4204 Duric Ferro-Humic Podzol 4205 Fragic Ferro-Humic Podzol 4206 Luvisolic Ferro-Humic Podzol 4207 Sombric Ferro-Humic Podzol	8 Gleyed 9 Lithic
	43 Humo-Ferric Podzol	4301 Orthic Humo-Ferric Podzol 4302 Ortstein Humo-Ferric Podzol 4303 Placic Humo-Ferric Podzol 4304 Duric Humo-Ferric Podzol 4305 Fragic Humo-Ferric Podzol 4306 Luvisolic Humo-Ferric Podzol 4307 Sombric Humo-Ferric Podzol	3 Turbic 7 Cryic 8 Gleyed 9 Lithic
5 Brunisolic	51 Melanic Brunisol	5101 Orthic Melanic Brunisol 5102 Degraded Melanic Brunisol	1 Andic 3 Turbic 7 Cryic 8 Gleyed 9 Lithic
	52 Eutric Brunisol	5201 Orthic Eutric Brunisol 5202 Degraded Eutric Brunisol	1 Andic 3 Turbic 7 Cryic 8 Gleyed 9 Lithic
	53 Sombric Brunisol	5301 Orthic Sombric Brunisol 5302 Degraded Sombric Brunisol	1 Andic 3 Turbic 7 Cryic 8 Gleyed 9 Lithic
	54 Dystric Brunisol	5401 Orthic Dystric Brunisol 5402 Degraded Dystric Brunisol	1 Andic 3 Turbic 7 Cryic 8 Gleyed 9 Lithic
6 Regosolic	61 Regosol	6101 Orthic Regosol 6102 Cumulic Regosol	3 Turbic 5 Saline 7 Cryic 8 Gleyed 9 Lithic
7 Gleysolic	71 Humic Gleysol	7101 Orthic Humic Gleysol 7102 Rego Humic Gleysol 7103 Fera Humic Gleysol	3 Turbic 4 Placic 5 Saline 6 Carbonated 7 Cryic 9 Lithic

Table 1 (continued)

Order	Great Group	Subgroup	Subgroup Modifier
	72 Gleysol	7201 Orthic Gleysol	3 Turbic
		7202 Rego Gleysol	4 Placic
		7203 Fera Gleysol	5 Saline
			6 Carbonated
			7 Cryic
			9 Lithic
	73 Luvic Gleysol	7301 Orthic Luvic Gleysol	7 Cryic
		7302 Humic Luvic Gleysol	9 Lithic
		7303 Fera Luvic Gleysol	
8 Organic	81 Fibrisol	8101 Fenno-Fibrisol	
		8102 Silvo-Fibrisol	
		8103 Sphagno-Fibrisol	
		8104 Mesic Fibrisol	
		8105 Humic Fibrisol	
		8106 Limno Fibrisol	
		8107 Cumulo Fibrisol	
		8108 Terric Fibrisol	
		8109 Terric Mesic Fibrisol	
		8110 Terric Humic Fibrisol	
		8111 Cryic Fibrisol	
		8112 Hydric Fibrisol	
		8113 Lithic Fibrisol	
	82 Mesisol	8201 Typic Mesisol	
		8202 Fibric Mesisol	
		8203 Humic Mesisol	
		8204 Limno Mesisol	
		8205 Cumulo Mesisol	
		8206 Terric Mesisol	
		8207 Terric Fibric Mesisol	
		8208 Terric Humic Mesisol	
		8209 Cryic Mesisol	
		8210 Hydric Mesisol	
		8211 Lithic Mesisol	
	83 Humisol	8301 Typic Humisol	
		8302 Fibric Humisol	
		8303 Mesic Humisol	
		8304 Limno Humisol	
		8305 Cumulo Humisol	
		8306 Terric Humisol	
		8307 Terric Fibric Humisol	
		8308 Terric Mesic Humisol	
		8309 Cryic Humisol	
		8310 Hydric Humisol	
		8311 Lithic Humisol	
	84 Folisol	8401 Typic Folisol	
		8402 Lithic Folisol	

C

clay *argile* (i) As a particle-size term: a size fraction less than 0.002 mm in equivalent diameter, or some other limit (geologists and engineers). (ii) As a rock term: a natural, earthy, fine grained material that develops plasticity with a small amount of water. (iii) As a soil term: a textural class. See also **texture, soil.** (iv) As a soil separate: a material usually consisting largely of clay minerals but commonly also of amorphous free oxides and primary minerals.

clay films (skins) *pellicules argileuses, enrobements argileux* Coatings of oriented clays on the surfaces of soil peds and mineral grains, and in soil pores.

clay loam *loam argileux* Soil material that contains 27% to 40% clay and 20% to 45% sand. See also **texture, soil.**

clay mineral *minéral argileux* Finely crystalline hydrous aluminum silicates and hydrous magnesium silicates with a phyllosilicate structure.

clayey *argileux* Containing large amounts of clay, or having properties similar to those of clay.

claypan *pan argileux, horizon d'accumulation argillique* A term used in the United States for a dense, compact layer in the profile having a much higher clay content than the overlying material, from which it is separated by a sharply defined boundary. In the Canadian classification system, this pan is recognized as a clay-enriched illuvial B (Bt) horizon.

climatic index *indice climatique* A simple, single numerical value that expresses climatic relationships; for example, the numerical value obtained in Transeau's precipitation–evaporation ratio.

climax *climax* A plant community of the most advanced type capable of development under, and in dynamic equilibrium with, the prevailing environment.

climosequence *climoséquence* A sequence of related soils that differ from one another in certain properties primarily as a result of the effect of climate as a soil-forming factor.

clinosequence *clinoséquence* A group of related soils that differ from one another in certain properties primarily as a result of the effect of the degree of slope on which they were formed. See also **toposequence.**

clod *motte* A compact, coherent mass of soil produced by digging or plowing. Clods usually slake easily with repeated wetting and drying.

coarse fragments *fragments grossiers* Rock or mineral particles greater than 2.0 mm in diameter. The names used for coarse fragments in soils are shown in Table 2.

coarse sand *sable grossier* See **separates, soil** and **texture, soil.**

coarse sandy loam *loam sableux grossier* See **texture, soil.**

coarse texture *texture grossière* The texture exhibited by sands, loamy sands, and sandy loams except very fine sandy loam. A soil containing large quantities of these textural classes. See also **sand, sandy,** and **moderately coarse texture.**

coating *revêtement, enrobement* Material covering the soil particles. See also **clay films (skins).**

cobble *caillou* See **cobblestone.**

cobblestone *caillou roulé, galet* Rounded or partially rounded rock or mineral fragment 7.5 to 25 cm (3 to 10 inches) in diameter. See also **coarse fragments.** In engineering practice, cobbles are greater than 7.5 cm (3 inches) but less than 20 cm (8 inches) in diameter.

cobbly *caillouteux, en galets* Containing appreciable quantities of cobblestones. The term is used to describe both soil and land. "Angular cobbly" is used when the fragments are less rounded. See also **coarse fragments.**

colloid *colloïde* A substance in a state of fine subdivision, whose particles are 10^{-4} to 10^{-7} cm in diameter.

colluvium *colluvion* A heterogeneous mixture of material that as a result of gravitational action has moved down a slope and settled at its base. See also **creep.**

colony *colonie* A macroscopically visible growth of microorganisms on a solid culture medium.

color *couleur* See **Munsell color system.**

columnar *colonnaire* See **structure types, soil.**

commensalism *commensalisme* A relationship between two kinds of organisms living in the same cultural environment without harm to either species and in which one or both members of the pair may obtain food, protection, or other benefits.

compact soil *sol compact* See **consistence.**

complex, soil *complexe de sols* A mapping unit used in detailed and reconnaissance soil surveys where two or more defined soil units are so intimately intermixed geographically that it is impractical, because of the scale used, to separate them.

Table 2. Coarse fragments

Shape and kind of fragments	*Up to 7.5 cm (3 inches) in diameter*	*7.5–25 cm (3–10 inches) in diameter*	*Over 25 cm (10 inches) in diameter*
Rounded and subrounded fragments			
All kinds of rock	Gravelly[1]	Cobbly	Stony (or bouldery)[2]
Irregularly shaped angular fragments			
Chert	Cherty	Coarse cherty	Stony
Other than chert	Angular gravelly	Angular cobbly[3]	Stony
	Up to 15 cm (6 inches) in length	*15–38 cm (6–15 inches) in length*	*Over 38 cm (15 inches) in length*
Thin flat fragments			
Thin flat sandstone, limestone, schist	Channery	Flaggy	Stony
Slate	Slaty	Flaggy	Stony
Shale	Shaly	Flaggy	Stony

[1] The individual classes are not always differentiating characteristics of mapping units.
[2] Bouldery is sometimes used where stones are larger than 24 inches.
[3] Formerly called "stony."

compost *compost* Organic residues, or a mixture of organic residues and soil, that have been piled, moistened, and allowed to decompose. Mineral fertilizers are sometimes added. If it is produced mainly from plant residue, it is often called "artificial manure" or "synthetic manure."

compressibility *compressibilité* The susceptibility of a soil to decrease in volume when subjected to load.

concentrated flow *écoulement concentré* The flowing of a rather large accumulated body of water over a relatively narrow course. It often causes serious erosion and gullying.

concrete frost *masse cryoconsolidée* Ice in the soil in such quantity as to form virtually a solid block.

concretion *concrétion* A mass or concentration of a chemical compound, such as calcium carbonate or iron oxide, in the form of a grain or nodule of varying size, shape, hardness, and color, found in soil and in rock. The term is sometimes restricted to concentrations having concentric fabric. The composition of some concretions is unlike that of the surrounding material.

conservation, soil *conservation du sol* (i) Protection of the soil against physical loss by erosion or against chemical deterioration; that is, excessive loss of fertility by either natural or artificial means. (ii) A combination of all methods of management and land use that safeguard the soil against depletion or deterioration by natural or man-induced factors. (iii) The division of soil science dealing with soil conservation (i) and (ii).

consistence *consistance* (i) The resistance of a material to deformation or rupture. (ii) The degree of cohesion or adhesion of the soil mass. Terms used for describing consistence at various soil moisture contents are:

wet soil—nonsticky, slightly sticky, sticky, and very sticky; nonplastic, slightly plastic, plastic, and very plastic.

moist soil—loose, very friable, friable, firm, and very firm; compact, very compact, and extremely compact.

dry soil—loose, soft, slightly hard, hard, very hard, and extremely hard.

cementation—weakly cemented, strongly cemented, and indurated.

In engineering practice, "consistency" has essentially the same meaning as "consistence."

consolidation *consolidation* The gradual reduction in volume of a soil mass resulting from an increase in compressive stress.

constitutive enzyme *enzyme de constitution* An enzyme whose formation does not depend on the presence of a specific substrate.

control section, soil *coupe témoin d'un sol* The vertical section upon which the taxonomic classification of soil is based. The control section usually extends to a depth of 100 cm (40 inches) in mineral materials and (tentative, system of soil classification for Canada) to 160 cm (64 inches) in organic materials.

coprogenous earth *terre coprogène* A material in some organic soils that contains at least 50% by volume of fecal pellets less than 0.5 mm in diameter.

coprolite *coprolithe* Fecal pellet, casting.

corrected lime potential *potentiel de chaux corrigé* Defined as $pH - \frac{1}{2}p(Ca + Mg) - \frac{1}{3}(pK_g - pY)$ where K_g is the solubility product of gibbsite and Y is the value of the ionic product $(Al)(OH)^3$ in the soil solution. The corrected lime potential (CLP) is also equal to $1/6 \log [(Ca + Mg)(OH)^2]^3/[(Al)(OH)^3]^2 + K_{CLP}$, where K_{CLP} is a constant dependent on temperature only. The CLP is therefore the ratio of the cube of the sum of the activities of Ca and Mg hydroxide to the square of the activity of Al hydroxide in the soil solution. The CLP has a relationship to the degree of base saturation based on the effective cation exchange capacity, but the pH and the lime potential do not. See also **lime potential.**

corrugation irrigation *irrigation par infiltration, par billons* See **irrigation methods.**

cradle knoll *butte de chablis* A small knoll formed by earth that was raised and left by an uprooted tree. See also **microrelief.**

crag and tail *crag et tail* An elongate hill that has at one end a steep face of ice-smoothed rock and at the leeward end a tapering streamlined tail of till.

creep *reptation* Slow mass movement of soil and soil material down rather steep slopes primarily under the influence of gravity, but aided by saturation with water and by alternate freezing and thawing. In engineering usage, creep is any general, slow displacement under load.

crevasse fillings *remplissage de crevasse* Ridges or hummocks formed from glacial sediments that were deposited by water in the cracks and crevasses of the ice.

critical density *densité critique* The unit weight of a saturated granular material below which it will lose strength and above which it will gain strength when subjected to rapid deformation. The critical density of a given material depends on many factors.

critical void ratio *indice des pores critique* The void ratio corresponding to the critical density.

cross-bedding *lits entrecroisés* An arrangement in which thin layers of stratified sediment are transverse or oblique to the main plane of stratification.

crotovina *crotovine* A former animal burrow in one soil horizon that has become filled with organic matter or material from another horizon. It is also spelled "krotovina."

crushing strength *résistance à l'écrasement* The force required to crush a mass of dry soil, or conversely, the resistance of a mass of dry soil to crushing. It is expressed in units of force per unit area (pressure).

crust *croûte* A surface layer of soil, from a few millimetres to 2.5 cm (1 inch) thick, that when dry is much more compact, hard, and brittle than the material just under it.

cryic layer *couche cryique* A perennially frozen layer.

cryology *cryologie* The study of the properties of snow, ice, and frozen ground.

Cryosolic *cryosolique* An order of soils proposed for adoption in the Canadian taxonomic system. Cryosolic soils are mineral or organic soils that have perennially frozen material within 1 m (3 ft) of the surface in some part of the soil body, or pedon. The mean annual soil temperature is less than 0 °C (32 °F). They are the dominant soils of the zone of continuous permafrost and become less widespread to the south in the zone of discontinuous permafrost; their maximum development occurs in organic and poorly drained, fine textured materials. The vegetation associated with Cryosolic soils varies from sparse plant cover in the high arctic, through tundra, to subarctic and northern boreal forests. The active layer of these soils is frequently saturated with water, especially near the frozen layers, and colors associated with gleying are therefore common in mineral soils, even those that occur on well drained portions of the landscape. They may or may not be markedly affected by cryoturbation. The order has three great groups: Turbic Cryosol, comprising mineral soils that display marked cryoturbation and generally occur on patterned ground; Static Cryosol, mineral soils without marked cryoturbation; and Organo Cryosol, organic soils.

cryoturbation *cryoturbation* Frost action, including frost heaving.

C

crystal *cristal* A homogeneous inorganic substance of definite chemical composition bounded by plane surfaces that form definite angles with each other to give the substance a regular geometrical form. See also **mineral, soil.**

crystal lattice *réseau cristallin* See **lattice structure.**

cuesta *cuesta* A hill or ridge that has a steep cliff on one side and a more gradual slope on the other side, controlled more or less by the attitude of the rock strata.

cultivation *façons culturales, travail du sol* Tillage to prepare land for seeding or transplanting, and later to control weeds and loosen the soil.

cumulo layer *couche cumulique* A layer of sandy, silty, or clayey material in an Organic soil.

cutan *cutane* A modification of the texture, structure, or fabric at natural surfaces in soil materials due to concenıration of particular soil constituents or in situ modification of the matrix. Cutans may be composed of any of the component substances of the soil material.

Darcy's law *loi de Darcy* (i) A law describing the rate of flow of water through porous media. (Named for Henry Darcy of Paris, who formulated it in 1856 from extensive work on the flow of water through sand filter beds.) As formulated by Darcy the law is:

$$Q = kS\left(\frac{H + e}{e}\right)$$

where
Q is the volume of water passed in unit time,
S is the area of the bed,
e is the thickness of the bed,
H is the height of the water on top of the bed, and
"k is a coefficient depending on the nature of the sand" and for cases where the pressure "under the filter is equal to the weight of the atmosphere."

(ii) Generalization for three dimensions: The rate of viscous flow of water in isotropic porous media is proportional to, and in the direction of, the hydraulic gradient. (iii) Generalization for other fluids: The rate of viscous flow of homogeneous fluids through isotropic porous media is proportional to, and in the direction of, the driving force.

Dark Brown *brun foncé* A great group of soils in the Chernozemic order. The soils occur in the cool to cold, semiarid grassland regions and have a dark brown surface (Ah or Ap) horizon on a lighter colored brownish B (Bm, Btj, or Bt) horizon, which may be absent, over a highly base saturated, usually calcareous C horizon.

Dark Gray *gris foncé* A great group of soils in the Chernozemic order. The soils occur in the cool to cold, subhumid grassland–forest transitional regions, and have a dark gray partially eluviated surface (Ahe or Ap) horizon and a brownish B (Bm, Btj, or Bt) horizon, which may be absent, over a highly base saturated, usually calcareous C horizon.

Dark Gray Gleysolic *gleysolique gris foncé* See **Humic Gleysol.**

deflation *déflation* The removal of fine soil particles from the soil by wind.

deflocculate *défloculer* (i) To separate the individual components of compound particles by chemical or physical means or both. (ii) To cause the particles of the disperse phase of a colloidal system to become suspended in the dispersion medium.

degradation *dégradation* The changing of a soil to a more highly leached and weathered state, usually accompanied by morphological changes such as the development of an eluviated, light-colored A (Ae) horizon.

dehydrogenase *déshydrogénase* An enzyme that accelerates oxidation of a substrate by removing hydrogen from it.

dehydrogenation *déshydrogénation* Removal of hydrogen as from a molecule.

delta *delta* A fan-shaped area at the mouth of a river formed by deposition of successive layers of sediments brought down from the land and spread out on the bottom of a basin. Where the stream current reaches quiet water, the bulk of the coarser load is dropped and the finer material is carried farther out. Deltas are recognized by nearly horizontal beds, termed bottomset beds, overlain by more steeply inclined and coarser-textured beds called foreset beds.

denitrification *dénitrification* The gaseous loss of nitrogen by either biological or chemical mechanisms, but exclusive of ammonia volatilization.

depleted soil *sol épuisé* Soil that has lost most of its available nutrients.

deposit *dépôt* Material left in a new position by a natural transporting agent such as water, wind, ice, or gravity, or by the activity of man.

diatomaceous earth *terre de diatomées* An earthy deposit of fine, grayish, siliceous material composed chiefly or wholly of the remains of diatoms. It may occur as a powder or as a porous, rigid material.

diatoms *diatomées* Algae having siliceous cell walls that persist as a skeleton after death. These microscopic unicellular or colonial algae belong to the class Bacillariophyceae. They are abundant in both fresh and salt waters and their remains are widely distributed in soils.

differential water capacity *capacité différentielle de rétention d'eau* See **water, soil.**

diffusivity *capacité de diffusion* See **water, soil.**

direct count *décompte direct, numération* In soil microbiology, any one of several methods for estimating by direct microscopic examination the total number of microorganisms in a given mass of soil.

discharge velocity *vitesse de décharge, d'écoulement* The rate of discharge of water through a porous medium per unit of total area perpendicular to the direction of flow.

disintegration *désintégration* The breakdown of rock and mineral particles into smaller particles by physical forces such as frost action. See also **weathering.**

disperse *disperser* (i) To break up compound particles, such as aggregates, into the individual component particles. (ii) To distribute or suspend fine particles, such as clay, in or throughout a dispersion medium, such as water.

dispersion medium *milieu de dispersion* The portion of a colloidal system in which the disperse phase is distributed.

diversion dam *digue, barrage de dérivation* A structure or barrier that diverts part of or all the water of a stream to a different course.

double layer *double couche* In colloid chemistry, the electric charges on the surface of the disperse phase, usually negative, and the adjacent diffuse layer, usually positive, of ions in solution.

drag *entrave, résistance à l'écoulement* The force retarding the flow of water or wind over the surface of the ground.

drain *drainer* (i) To provide channels, such as open ditches or drain tile, so that excess water can be removed by surface or by internal flow. (ii) To lose water from the soil by percolation.

drain tile *tuyau de drainage* Pipe used to conduct drainage water from the soil.

drumlin *drumlin* An elongate or oval hill of glacial drift, commonly glacial till, deposited by glacier ice and having its long axis parallel to the direction of ice movement.

dry aggregate *agrégat sec* A compound or secondary soil particle that is not broken down by dry sieving.

dryland farming *aridoculture, culture sèche* The practice of growing crops in areas of low rainfall without irrigation.

dry-weight percentage *pourcentage-poids sec* The ratio of the weight of any constituent of a soil to the ovendry weight of the soil. See also **ovendry soil.**

dunes *dunes* Wind-built ridges and hills of sand formed in the same manner as snowdrifts. They are started by some obstruction, such as a bush, boulder, or fence, that causes an eddy or otherwise thwarts the sand-laden wind. Once begun, the dunes themselves offer further resistance and they grow to form various shapes.

duric *durique* A Bc horizon that is strongly cemented and usually has an abrupt upper boundary and a diffuse lower

boundary. Cementation is usually strongest near the upper boundary. Ordinarily the color is similar to that of the parent material and the structure is amorphous or coarse platy. Air-dried clods do not slake when immersed in water. The duric horizon does not meet the requirements of a podzolic B horizon but may meet those of a Bt horizon.

dust mulch *mulch de poussière* A loose, finely granular, or powdery layer on the surface of the soil, usually produced by shallow cultivation, and also by deposition.

dy *dy* Finely divided, partly decomposed organic material accumulated in peat soils in the transition zone between the peat and the underlying mineral material. Dy-peat also refers to amorphous material formed from humus soils that have settled in lake waters. Dy is poorer in nutrients than gyttja and is characterized by a high C:N ratio.

dynamometer *dynamomètre* An instrument for measuring draft of tillage implements, and for measuring resistance of soil to penetration by tillage implements.

Dystric Brunisol *brunisol dystrique* A great group of soils in the Brunisolic order. The soils may have mull Ah horizons less than 5 cm (2 inches) thick. They have Bm horizons in which the base saturation (NaCl) is usually 65% to 100% and the pH ($CaCl_2$) is usually 5.5 or lower.

ecology *écologie* The study of the relationship between organisms and their environment.

ectotrophic mycorrhiza *mycorhize ectotrophe* A mycorrhizal association in which the fungal hyphae form a compact mantle on the surface of the roots. Mycelial strands extend inward between cortical cells and outward from the mantle to the surrounding soil.

edaphic *édaphique* (i) Of or pertaining to the soil. (ii) Resulting from, or influenced by, factors inherent in the soil or other substrate rather than by climatic factors.

edaphology *édaphologie* The science that deals with the influence of soils on living things, particularly plants, including man's use of land for plant growth.

effective cation exchange capacity *capacité d'échange cationique effective* The sum of cations that a soil can adsorb in its natural state.

effective precipitation *précipitation effective* The portion of the total precipitation that becomes available for plant growth.

electrokinetic potential *potentiel électrocinétique* (i) In a colloidal system, the difference in potential between the immovable layer attached to the surface of the dispersed phase and the dispersion medium. (ii) The work done in bringing a unit charge from infinity to a reference point in the liquid layer attached to the solid phase in a colloidal system.

eluvial horizon *horizon éluvial* A soil horizon that has been formed by the process of eluviation. See also **illuvial horizon.**

eluviation *éluviation* The transportation of soil material in suspension or in solution within the soil by the downward or lateral movement of water.

end moraine, or terminal moraine *moraine terminale* A ridgelike accumulation of drift built chiefly along the terminal margin of a valley glacier or the margin of an ice sheet. It is mainly the result of deposition by ice, or deformation by ice thrust, or both.

endoenzyme, or intracellular enzyme *endoenzyme* An enzyme formed within the cell and not excreted into the medium.

endotrophic *endotrophe* Nourished or receiving nourishment from within; for example, fungi or their hyphae receiving nourishment from plant roots in a mycorrhizal association.

endotrophic mycorrhiza *mycorhize endotrophe* A mycorrhizal association in which the fungal hyphae are present on root surfaces as individual threads that may penetrate directly into root hairs, other epidermal cells, and occasionally into cortical cells. Individual threads extend from the root surface outward into the surrounding soil.

engineering, soil *génie des sols* See **mechanics and engineering, soil.**

enrichment culture *façon culturale d'enrichissement* A technique in which environmental, including nutritional, conditions are controlled to favor the development of a specific organism or group of organisms.

enzyme *enzyme* A proteinaceous organic substance, produced within an organism, that acts like a catalyst. See also **adaptive enzyme, constitutive enzyme, endoenzyme,** and **exoenzyme.**

eolian deposit *dépôt éolien* Sand, or silt, or both, deposited by the wind. See also **loess** and **dunes.**

equivalent diameter *diamètre équivalent* In sedimentation analysis, the diameter assigned to a nonspherical particle. It is numerically equal to the diameter of a spherical particle having the same density and velocity of fall.

equivalent weight of a soil colloid *poids équivalent d'un colloïde du sol* The weight of clay or organic colloid that has a combining power equal to 1 gram-atomic weight of hydrogen.

erode *éroder* To wear away or remove the land surface by wind, water, or other agents.

erodible *érodable* Susceptible to erosion. It is expressed by terms such as highly erodible and slightly erodible.

erosion *érosion* (i) The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep. (ii) Detachment and movement of soil or rock by water, wind, ice, or gravity. The following terms are used to describe different types of water erosion:

accelerated erosion érosion accélérée Erosion much more rapid than normal, natural, geological erosion, primarily as a result of the influence of the activities of man or animals.

geological erosion érosion géologique The normal or natural erosion caused by geological processes acting over long geologic periods and resulting in the wearing away of mountains, the dissection of plains, and the building up of floodplains and coastal plains. Synonymous with *natural erosion.*

gully erosion érosion en ravins The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to various depths, from about 0.3 m (1 ft) to as much as 30 m (100 ft).

natural erosion érosion naturelle Wearing away of the earth's surface by water, ice, or other natural agents under natural environmental conditions such as climate and vegetation, undisturbed by man. Synonymous with *geological erosion.*

normal erosion érosion normale The gradual erosion of land used by man. It does not greatly exceed natural erosion. See *natural erosion.*

rill erosion érosion en rigoles An erosion process in which many small channels a few centimetres deep are formed; it occurs mainly on recently cultivated soils. See also **rill.**

sheet erosion érosion en nappe The removal of a fairly uniform layer of soil from the land surface by runoff water.

splash erosion érosion par éclaboussement The spattering of small soil particles caused by the impact of raindrops on very wet soils. The loosened and spattered particles may, or may not, be subsequently removed by surface runoff.

erosion classes *classes d'érosion* A grouping of erosion conditions based on the degree of erosion or on the characteristic patterns. The classes apply to accelerated erosion, but not to normal, natural, or geological erosion. Four erosion classes are recognized for water erosion and three for wind erosion. (For details see *The System of Soil Classification for Canada.*)

erosion pavement *dallage d'érosion* A layer of coarse fragments such as sand, gravel, cobbles, or stones that remains on the surface of the ground after the removal of fine particles by erosion.

erratic *bloc erratique* A transported rock fragment different from the bedrock where it lies. The term is generally applied to fragments transported by glacier ice or by floating ice.

esker *esker* A winding ridge of irregularly stratified sand, gravel, and cobbles deposited under the ice by a rapidly flowing glacial stream.

eubacteriales *eubactériales* An order of the class Schizomycetes. True bacteria.

Eutric Brunisol *brunisol eutrique* A great group of soils in the Brunisolic order. The soils may have mull Ah horizons less than 5 cm (2 inches) thick, and they have Bm horizons in which the base saturation (NaCl) is 100%.

eutrophic *eutrophe* Having concentrations of nutrients optimal or nearly so for plant or animal growth. It is used to describe nutrient or soil solutions.

E

evapotranspiration *évapotranspiration* The loss of water from a given area during a specified time by evaporation from the soil surface and by transpiration from the plants. Potential evapotranspiration is the maximum transpiration that can occur in a given weather situation with a low-growing crop that is not short of water and does not completely shade the ground.

excessive drainage *drainage excessif* Too great or too rapid a loss of water from soils, either by percolation or by surface flow. The loss is greater than that necessary to prevent the development of an anaerobic condition for an appreciable length of time.

exchange acidity *acidité d'échange* The titratable hydrogen and aluminum that can be replaced from the adsorption complex by a neutral salt solution. It is usually expressed as milliequivalents per 100 g of soil (meq/100 g soil).

exchange capacity *capacité d'échange* The total ionic charge of the adsorption complex that is active in the adsorption of ions. See also **anion exchange capacity** and **cation exchange capacity.**

exchangeable cation percentage *pourcentage de cations échangeables* The extent to which the adsorption complex of a soil is occupied by a particular cation. It is expressed as:

$$\text{ECP} = \frac{\text{exchangeable cation (meq/100 g soil)}}{\text{cation exchange capacity (meq/100 g soil)}} \times 100.$$

exchangeable phosphate *phosphate échangeable* The phosphate anion reversibly attached to the surface of the solid phase of the soil in such form that it may go into solution by anionic equilibrium reactions with isotopes of phosphorus or with other anions of the liquid phase without solution of the colloid phase to which it was attached.

exchangeable potassium *potassium échangeable* The potassium that is held by the adsorption complex of the soil and is easily exchanged with the cation of neutral nonpotassium salt solutions.

exchangeable sodium percentage *pourcentage de sodium échangeable* The extent to which the adsorption complex of a soil is occupied by sodium. It is expressed as:

$$\text{ESP} = \frac{\text{exchangeable sodium (meq/100 g soil)}}{\text{cation exchange capacity (meq/100 g soil)}} \times 100.$$

exoenzyme, or extracellular enzyme *exoenzyme* An enzyme excreted by a microorganism into the environment. An enzyme that acts outside the cell.

external drainage *drainage superficiel* The natural elimination or accumulation of precipitation water on the soil surface.

extract, soil *extrait de sol* The solution separated from a soil suspension or from a soil by filtration, centrifugation, suction, or pressure.

F layer *horizon F* See **horizon, soil.**

fabric, soil *microstructure du sol, fabrique du sol* The physical constitution of a soil material expressed by the spatial arrangement of the solid particles and associated voids.

facultative anaerobe *anaérobie facultatif* A microorganism that lives under either aerobic or anaerobic conditions.

fallow land *jachère* Cultivated land that is not being used for a crop.

family, soil *famille de sols* A category in the Canadian system of soil classification. Differentiae are primarily texture, drainage, thickness of horizons, permeability, mineralogy, consistence, and reaction.

fermentation *fermentation* Anaerobic oxidation of carbohydrates and carbohydratelike compounds by enzyme action of microorganisms; gaseous oxygen is not involved in this energy-yielding process.

Ferro-Humic Podzol *podzol ferro-humique* A great group of soils in the Podzolic order. The upper 10 cm (4 inches) of the Bhf horizon contain 5% or more organic carbon, 0.6% or more pyrophosphate-extractable Al and Fe, and either a ratio of organic carbon to pyrophosphate-extractable Fe of less than 20, or a percentage of pyrophosphate-extractable Fe greater than 0.3, or both. The B horizon is usually overlain by a light-colored, eluviated horizon (Ae) and a mor humus layer.

fertility, soil *fertilité du sol* The status of a soil in relation to the amount and availability to plants of elements necessary for plant growth.

fertilizer *engrais* Any organic or inorganic material of natural or synthetic origin that is added to a soil to supply certain elements essential to the growth of plants.

fertilizer grade *formule d'engrais* The guaranteed minimum analysis, in percent, of the major plant nutrient elements contained in a fertilizer material or in a mixed fertilizer. The analysis usually gives the percentages of N, P_2O_5, and K_2O, but proposals have been made to change the designation to the percentages of N, P, and K.

fertilizer requirement *besoin en engrais* The quantity of certain plant nutrient elements needed, in addition to the amount supplied by the soil, to increase plant growth to a designated optimum.

fibric layer *couche fibrique* A layer of organic soil material containing large amounts of weakly decomposed fiber whose botanical origin is readily identifiable.

Fibrisol *fibrisol* A great group of soils in the Organic order that are saturated for most of the year. The soils have a dominantly fibric middle tier, or middle and surface tiers if a terric, lithic, hydric, or cryic contact occurs in the middle tier.

field capacity *capacité au champ* The percentage of water remaining in the soil 2 or 3 days after the soil has been saturated and free drainage has practically ceased. The percentage may be expressed in terms of weight or volume. See also **moisture tension, soil.**

fifteen-atmosphere percentage *pourcentage à 15 atmosphères* See **moisture tension, soil.**

fifteen-bar percentage *pourcentage à 15 bars* See **moisture tension, soil.**

film water *eau pelliculaire* A layer of water that surrounds soil particles and varies in thickness from 1 or 2 to 100 or more molecular layers. Usually it is considered to be the water that remains after drainage, because it is not distinguishable in saturated soils.

fine clay *argile fine* A clay fraction of specified size less than 2 μm, usually less than 0.2 or 0.08 μm.

fine earth *terre fine* The fraction of mineral soil consisting of particles less than 2 mm in diameter.

fine sand *sable fin* (i) A soil separate. See also **separates, soil.** (ii) A soil textural class. See also **texture, soil.**

fine sandy loam *loam sableux fin* See **texture, soil.**

fine texture *texture fine* Consisting of or containing large quantities of the fine fractions, particularly of silt and clay. It includes all the textural classes of clay loams and clays: clay loam, sandy clay loam, silty clay loam, sandy clay, silty clay, and clay. Sometimes it is subdivided into clayey texture and moderately fine texture. See also **texture, soil.**

fines *fraction fine* A term used in soil mechanics for the portion of a soil finer than a No. 200 (74-μm) U.S. standard sieve.

firm *ferme* A term describing the consistence of a moist soil that offers distinctly noticeable resistance to crushing, but can be crushed with moderate pressure between the thumb and forefinger. See also **consistence.**

first bottom *fond alluvial, plaine alluviale* The normal floodplain of a stream.

fixation *fixation* The process or processes in a soil by which certain chemical elements essential for plant growth are converted from a soluble or exchangeable form to a much less soluble or nonexchangeable form, for example, phosphate fixation. See also **nitrogen fixation.**

fixed phosphorus *phosphore fixé* (i) Phosphorus that has been changed to a less soluble form as a result of reaction with the soil; moderately unavailable phosphorus. Specifically, it is the quantity of soluble phosphorus compounds that, when added to soil, becomes chemically or biologically attached to the solid phase of soil and cannot be recovered by extracting the soil with a specified extractant under specified conditions. Some of these extractants are water, carbonated water, and dilute solutions of strong mineral acids with or without fluoride or other exchangeable anion. (ii) Applied phosphorus that is not absorbed by plants during the first cropping year. (iii) Soluble phosphorus that has become attached to the solid phase of the soil in forms highly unavailable to crops; unavailable phosphorus; or phosphorus in other than readily or moderately available forms.

flagellum *flagelle* A flexible, whiplike appendage on cells, used as an organ of locomotion.

flaggy *en dalles* See **coarse fragments.**

flagstone *dalle* A thin fragment of sandstone, limestone, slate, shale, or rarely of schist, 15 to 37 cm (6 to 15 inches) long. See also **coarse fragments.**

flooding *irrigation par inondation* See **irrigation methods.**

floodplain *plaine d'inondation* The land bordering a stream, built up of sediments from overflow of the stream and subject to inundation when the stream is at flood stage. See also **first bottom.**

flow velocity *vitesse d'écoulement, débit* The volume of water transferred per unit of time and per unit of area in the direction of the net flow of water in soil.

fluvial deposits *dépôts fluviaux* All sediments, past and present, deposited by flowing water, including glaciofluvial deposits. Wave-worked deposits and deposits resulting from sheet erosion and mass wasting are not included.

fluvioglacial *fluvio-glaciaire* See **glaciofluvial deposits.**

foliar diagnosis *diagnostic foliaire* An estimation of the extent to which plants are getting certain necessary chemical elements from the soil, based on an examination of the color and the growth habits of the foliage of the plants.

Folisol *folisol* A great group of soils in the Organic order. The

soils are not usually saturated for more than a few days a year and consist of 10 cm (4 inches) or more of L-H horizons derived from leaf litter, twigs, branches, and mosses. A lithic contact or fragmented material occurs at a depth of less than 160 cm (64 inches). Mineral layers less than 10 cm (4 inches) thick may lie above the lithic contact.

forest floor *couche holorganique, couverture morte, litière* All dead vegetable and organic matter, including litter and unincorporated humus, on the mineral soil surface under forest vegetation.

forest soils *sols forestiers* (i) Soils developed under forest vegetation. (ii) (European usage) Soils formed in temperate climates under forest vegetation.

fragic *fragique* A Bx or BCx horizon of high bulk density and consistence that is firm and brittle when moist, and hard to extremely hard when dry. Commonly it has bleached fracture planes separating very coarse prismatic units, and frequently the secondary structure is platy. Usually the fragic horizon is similar in color to the parent material but differs from it in structure, consistence, and bulk density. Air-dried clods slake when immersed in water. The upper boundary is usually abrupt and clear but the lower boundary is diffuse. The fragic horizon does not meet the criteria of a podzolic B horizon but may meet those of a Bt (Btx) horizon. See **fragipan.**

fragipan *fragipan* A natural subsurface horizon having a higher bulk density than the solum above; seemingly cemented when dry, but showing moderate to weak brittleness when moist. The layer is low in organic matter, mottled, and slowly or very slowly permeable to water; it usually has some polygon-shaped bleached cracks. It is found in profiles of either cultivated or virgin soils but not in calcareous material.

free acidity *acidité libre* The titratable acidity in the aqueous phase of a soil. It may be expressed in milliequivalents per unit mass of soil or in other suitable units.

free oxides *oxydes libres* Oxides and hydroxides of iron, aluminum, silicon, manganese, and titanium, usually of fine particle size, that occur uncombined with other elements and often as coatings on primary and secondary minerals.

freezing index, F (degree-days) *indice de gel, F (degrés-jours)* The number of degree-days between the highest and lowest points on the cumulative degree-days – time curve for one freezing season. It is used as a measure of the combined duration and magnitude of below-freezing temperature occurring during any given freezing season. The index determined for air temperatures 137.3 cm (4.5 ft) above the ground is commonly designated as the air freezing index, whereas that determined for temperatures immediately below a surface is called the surface freezing index.

friable *friable* A consistence term pertaining to the ease of crumbling of soils. See also **consistence.**

frost action *gélivation* Freezing and thawing of moisture in materials and the resultant effects on these materials and on the structures of which they are a part or with which they are in contact.

frost heave *soulèvement par le gel* The raising of a surface caused by ice in the underlying soil.

fulvic acids *acides fulviques* A term with various meanings that usually refers to the mixture of organic substances that remains in solution when a dilute alkali extract from the soil has been acidified.

fungi *champignons* The allophytic plants that lack chlorophyll and are filamentous in structure; molds.

furrow irrigation *irrigation par rigoles* See **irrigation methods.**

genesis, soil *genèse des sols, pédogenèse* (i) The mode of origin of the soil, especially the processes or soil-forming factors responsible for the development of the solum, the true soil, from unconsolidated parent material. (ii) The division of soil science dealing with soil genesis (i).

genetic *génétique* Resulting from or produced by soil-forming processes, for example, a genetic soil profile or a genetic horizon.

genetic pan *pan génétique* A natural subsurface soil layer of low or very low permeability having a high concentration of small particles and differing in certain physical and chemical properties from the soil immediately above or below the pan. See also **claypan** and **fragipan.**

genus *genre* A group of very closely related species.

geography, soil *géographie des sols* Geography dealing with the areal distribution of soil types.

geological erosion *érosion géologique* See **erosion** (ii).

germicide *germicide* An agent capable of killing germs, usually pathogenic microorganisms.

gilgai *gilgaï* The microrelief of soils produced by expansion and contraction caused by changes in moisture. Gilgai is found in soils that contain large amounts of clay, which swells and shrinks noticeably with wetting and drying. It usually occurs as a succession of microbasins and microknolls in nearly level areas or as microvalleys and microridges parallel to the direction of the slope. See also **microrelief.**

glacial drift *drift glaciaire, matériau de transport glaciaire, dépôt glaciaire* All rock material carried by glacier ice and glacial meltwater, or rafted by icebergs. This term includes till, stratified drift, and scattered rock fragments.

glacial till *till glaciaire* See **till.**

glaciofluvial deposits *dépôts fluvio-glaciaires* Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and may occur in the form of outwash plains, deltas, kames, eskers, and kame terraces. See also **glacial drift** and **till.**

gleyed soil *sol gleyifié* Soil affected by gleysation.

gleysation *gleyification* A soil-forming process, operating under poor drainage conditions, which results in the reduction of iron and other elements and in gray colors, and mottles. See also **Gleysolic** and **Gleysol.**

Gleysol *gleysol* A great group of soils in the Gleysolic order. A thin (less than 8 cm, or 3 inches) Ah horizon is underlain by mottled gray or brownish gleyed material, or the soil has no Ah horizon. Up to 40 cm (16 inches) of mixed peat (bulk density 0.1 or more) or 60 cm (24 inches) of fibric moss peat (bulk density less than 0.1) may occur on the surface.

Gleysolic *gleysolique* An order of soils developed under wet conditions and permanent or periodic reduction. These soils have low chromas, or prominent mottling, or both, in some horizons. The great groups Gleysol, Humic Gleysol, and Luvic Gleysol are included in the order.

glycophytes *glycophytes* Nonhalophytic plants or plants that do not grow well when the osmotic pressure of the soil solution rises above 2 bars.

grain density *densité particulaire* See **particle density.**

grain-size analysis (mechanical analysis) *analyse granulométrique, analyse mécanique* See **particle-size analysis.**

grain-size distribution *répartition granulométrique* See **particle-size distribution.**

granular *granulaire* See **structure, soil** and **structure types, soil.**

granule *granule* Spheroidal soil aggregate.

gravel *gravier* Rock fragments 2 mm to 7.5 cm (3 inches) in diameter.

gravelly *graveleux* Containing appreciable or significant amounts of gravel. The term is used to describe soils or lands. See also **coarse fragments.**

gravitational potential *potentiel d'eau libre, de gravité* See **water, soil.**

gravitational water *eau libre, eau de gravité* Water that moves into, through, or out of the soil by gravity.

Gray Brown Luvisol *luvisol brun gris* A great group of soils in the Luvisolic order occurring in a moderate climate, higher than 5.5°C (42°F) mean annual temperature, and developed under deciduous and coniferous forest cover. These soils have a dark-colored mull-like surface (Ah) horizon, a light-colored eluviated (Ae) horizon, a brownish illuvial B (Bt) horizon, and a basic or calcareous C horizon. The solum is highly base saturated (NaCl extraction). This group includes soils formerly called Gray Brown Podzolic.

Gray Luvisol *luvisol gris* A great group of soils in the Luvisolic order occurring in moderately cool climates, where the mean annual temperature is usually lower than 5.5°C (42°F). The soils have developed under deciduous and coniferous forest cover, and have an eluviated light-colored surface (Ae) horizon, a brownish illuvial B (Bt) horizon, and usually a calcareous C horizon. The solum is base saturated (NaCl extraction). The Ahe horizon, if present, is less than 5 cm (2 inches) thick. This group includes soils formerly called Gray Wooded.

great group *grand groupe* A category in the Canadian system of soil classification. It is a taxonomic group of soils having certain morphological features in common and a similar pedogenic environment. Examples are Black, Solonetz, Gray Brown Luvisol, Humic Podzol, Melanic Brunisol, Regosol, Gleysol, and Fibrisol.

green manure *engrais vert* Plant material incorporated into the soil to improve it, while the plant material is still green.

green-manure crop *culture d'engrais vert* A crop grown for use as green manure. See also **green manure.**

ground fire *feu de terre* (Forestry) A fire that consumes all the organic material of the forest floor and also burns into the underlying soil, for example, a peat fire. It differs from a surface fire by being invulnerable to wind. In a surface fire the flames are visible and burning is accelerated by wind, whereas in a ground fire wind is not generally a serious factor.

ground moraine *moraine de fond* An unsorted mixture of rocks, boulders, sand, silt, and clay deposited by glacial ice. The predominant material is till, but some stratified drift is present. Most of the till is thought to have accumulated under the ice by lodgment, but some till has been let down from the upper surface of the ice by ablation. Ground moraine is usually in the form of undulating plains having gently sloping swells, sags, and enclosed depressions.

groundwater *eau souterraine* Water that is passing through or standing in the soil and the underlying strata. It is free to move by gravity. See also **water table.**

gully *ravin* A channel caused by erosion and the concentrated but intermittent flow of water during and immediately after heavy rains. It is deep enough to interfere with and not be removed by tillage operations.

gully erosion *érosion en ravins* See **erosion** (ii).

gyttja *gyttja* A Swedish word, pronounced "yuetya." A nutrient-rich sedimentary peat consisting mainly of plankton, other plant and animal residues, and mud. It is deposited in water in a finely divided condition.

H

H layer *horizon H* See **horizon, soil.**

habitat *habitat* The natural environment of an organism.

halomorphic soil *sol halomorphe* A general term for saline and alkali soils.

halophytic vegetation *végétation halophile* Vegetation that grows naturally in soils having a high content of various salts. It usually has fleshy leaves or thorns and resembles desert vegetation.

hardpan layer *couche durcie, cuirasse* See **pans.**

heat capacity (volume) *capacité calorifique* The amount of heat required to raise the temperature of a unit volume of soil by one degree. It may also be expressed in terms of weight.

heat flux density *densité du flux thermique* The quantity of heat flowing per unit of time across a unit area.

heavy clay *argile lourde* A textural class. See also **texture, soil.**

heavy soil *sol lourd* A soil having a high content of the fine separates, particularly clay, or a soil having a high drawbar pull and therefore hard to cultivate. See also **fine texture.**

heterotrophic *hétérotrophe* Capable of deriving energy for life processes only from the decomposition of organic compounds, and incapable of using inorganic compounds as sole sources of energy or for organic synthesis. See also **autotrophic.**

honeycomb frost *gel alvéolaire* Ice in the soil in insufficient quantity to be continuous, thereby giving the soil an open, porous structure that readily permits water to enter.

horizon, soil *horizon du sol* A layer of soil or soil material approximately parallel to the land surface; it differs from adjacent genetically related layers in properties such as color, structure, texture, consistence, and chemical, biological, and mineralogical composition. A list of the designations and some of the properties of soil horizons and layers follows. More detailed definitions of some horizons and layers may be found in *The System of Soil Classification for Canada*.

Organic layers contain 17% or more organic carbon. Two groups of these layers are recognized:

O—An organic layer developed mainly from mosses, rushes, and woody materials.

Of—The least decomposed organic layer, containing large amounts of well-preserved fiber, and called the fibric layer.

Om—An intermediately decomposed organic layer containing less fiber than an Of layer and called the mesic layer.

Oh—The most decomposed organic layer, containing only small amounts of raw fiber and called the humic layer.

L-F-H—Organic layers developed primarily from leaves, twigs, and woody materials, with a minor component of mosses.

L—The original structures of the organic material are easily recognized.

F—The accumulated organic material is partly decomposed.

H—The original structures of the organic material are unrecognizable.

Mineral horizons and layers contain less than 17% organic carbon.

A—A mineral horizon formed at or near the surface in the zone of removal of materials in solution and suspension, or maximum in situ accumulation of organic carbon, or both.

B—A mineral horizon characterized by one or more of the following:

1) An enrichment in silicate clay, iron, aluminum, or humus.

2) A prismatic or columnar structure that exhibits pronounced coatings or stainings associated with significant amounts of exchangeable sodium.

3) An alteration by hydrolysis, reduction, or oxidation to give a change in color or structure from the horizons above or below, or both.

C—A mineral horizon comparatively unaffected by the pedogenic processes operative in A and B, except gleying, and the accumulation of carbonates and more soluble salts.

R—Underlying consolidated bedrock that is too hard to break with the hands or to dig when moist.

Roman numerals are prefixed to horizon designations to indicate unconsolidated lithologic discontinuities in the profile. Roman numeral I is understood for the uppermost material and usually is not written. Subsequent contrasting materials are numbered consecutively in the order in which they are encountered downward, that is, II, III, and so on.

Lowercase Suffixes

b—A buried soil horizon.

c—A cemented (irreversible) pedogenic horizon. Ortstein, placic, and duric horizons are examples.

ca—A horizon of secondary carbonate enrichment where the concentration of lime exceeds that in the unenriched parent material.

e—A horizon characterized by removal of clay, iron, aluminum, or organic matter alone or in combination and higher in color value by one or more units when dry than an underlying B horizon. It is used with A (Ae).

f—A horizon enriched with amorphous material, principally Fe and Al combined with organic matter. It usually has a chroma of 3 or more. The criteria for an f horizon except for Bgf are: it contains 0.6% or more pyrophosphate-extractable Fe plus Al in textures finer than sand and 0.4% or more in sands; the ratio of pyrophosphate-extractable Fe plus Al to clay (less than 2 μm) is greater than 0.5; and organic carbon exceeds 0.5%. These horizons are differentiated on the basis of organic carbon content into:

Bf, 0.5% to 5% organic carbon

Bhf, more than 5% organic carbon.

g—A horizon characterized by gray colors, or prominent mottling indicative of permanent or periodic intense reduction, or both; for example, Aeg, Btg, Bg, and Cg.

gf (used with B)—The dithionite-extractable Fe of this horizon exceeds that of the IC by 1% or more and the dithionite-extractable Al does not exceed that of the IC by more than 0.5%.

h—A horizon enriched with organic matter.

Ah—An A horizon of organic matter accumulation. It contains less than 17% organic carbon. It is one Munsell unit of color value darker than the layer immediately below, or it has at least 0.5% more organic carbon than the IC, or both.

Ahe—This horizon has been degraded, as evidenced by streaks and splotches of light and dark gray material and often by platy structure.

Bh—This horizon contains more than 1% organic carbon and less than 0.3% pyrophosphate-extractable Fe; the ratio of organic carbon to pyrophosphate-extractable Fe is 20 or more.

j—This is used as a modifier of suffixes e, g, n, and t to denote an expression of, but failure to meet, the specified limits of the suffix it modifies; for example, Aej is an eluvial horizon that is thin, discontinuous, or faintly discernible.

k—Presence of carbonate.

m—A horizon slightly altered by hydrolysis, oxidation, or solution, or all three, to give a change in color, or structure, or both.

n—A horizon in which the ratio of exchangeable Ca to exchangeable Na is 10 or less.

p—A layer disturbed by man's activities, for example, Ap.

s—A horizon containing detectable soluble salts.

sa—A horizon of secondary enrichment of salts more soluble than Ca and Mg carbonates, where the concentration of salts exceeds that present in the unenriched parent material.

t—A horizon enriched with silicate clay, as indicated by a higher clay content (by specified amounts) than the overlying eluvial horizon, a thickness of at least 5 cm, oriented clay in some pores, or on ped surfaces, or both, and usually a higher ratio of fine (less than 0.2 μm) to total clay than in the IC horizon.

x—A horizon of fragipan character.

y—A horizon affected by cryoturbation.

z—A perennially frozen layer.

hue *teinte, tonalité* The aspect of color that is determined by the wavelengths of light, and changes with the wavelength. Munsell hue notations indicate the visual relationship of a color to red, yellow, green, blue, or purple, or an intermediate of these hues. See also **Munsell color system; chroma;** and **value, color.**

humic acids *acides humiques* A mixture of various dark-colored organic substances precipitated by acidifying a dilute alkali extract from the soil. The term is used by some workers to designate only the alcohol-insoluble part of this precipitate.

Humic Gleysol *gleysol humique* A great group of soils in the Gleysolic order. A dark-colored A (Ah or Ap) horizon more than 8 cm (3 inches) thick is underlain by mottled gray or brownish gleyed mineral material. It may have up to 40 cm (16 inches) of mixed peat (bulk density 0.1 or more) or up to 60 cm (24 inches) of fibric moss peat (bulk density less than 0.1) on the surface. This group includes soils formerly classified as Dark Gray Gleysolic and Meadow.

humic layer *couche humique* A layer of highly decomposed organic soil material containing little fiber.

Humic Podzol *podzol humique* A great group of soils in the Podzolic order occurring in cool humid coastal regions, cool humid inland locations at higher altitudes, and some peaty depressions. The soils have a dark brown to black Bh horizon at least 10 cm (4 inches) thick, having more than 1% organic carbon, less than 0.3% pyrophosphate-extractable Fe, a ratio of organic carbon to pyrophosphate-extractable Fe of 20 or more, and a very low base saturation (NaCl extraction). A thin iron pan or a series of very thin (totaling less than 2.5 cm, or 1 inch) iron pans may be present.

humification *humification* The processes by which organic matter decomposes to form humus. In humus the initial structures or shapes can no longer be recognized. See also **humus.**

humin *humine* The fraction of the soil organic matter that is not dissolved when the soil is treated with dilute alkali.

Humisol *humisol* A great group of soils in the Organic order that are saturated for most of the year. The soils have a dominantly humic middle tier, or middle and surface tiers if a terric, lithic, hydric, or cryic contact occurs in the middle tier.

Humo-Ferric Podzol *podzol humo-ferrique* A great group of soils in the Podzolic order. The upper 10 cm (4 inches) of the B horizon (Bf) contains between 0.5% and 5% organic carbon and 0.6% or more pyrophosphate-extractable Al and Fe (0.4% for sands). The ratio of organic carbon to pyrophosphate-extractable Fe is less than 20. Most of the typical Podzols are classified as Humo-Ferric Podzols.

humus *humus* (i) The fraction of the soil organic matter that remains after most of the added plant and animal residues have decomposed. It is usually dark colored. (ii) Humus is also used in a broader sense to designate the humus forms referred to as forest humus. They include principally mor, moder, and mull. See also **organic matter, soil; mor; moder; mull;** and **horizon, soil.** (iii) All the dead organic material on and in the soil that undergoes continuous breakdown, change, and synthesis.

hydration *hydratation* Chemical combination of water with another substance.

hydraulic conductivity *conductivité hydraulique* See **water, soil.**

hydraulic gradient *gradient hydraulique* See **water, soil.**

hydraulic head *charge hydraulique* See **water, soil.**

hydric layer *couche hydrique* A layer of water in the control section of Organic soils, extending from a depth of not less than 40 cm (16 inches) to a depth of more than 160 cm (64 inches).

hydrogenic soil *sol hydrogénique* Soil developed under the influence of water standing within the profile for prolonged periods; it is formed mainly in cold, humid regions.

hydrologic cycle *cycle hydrologique* The conditions through which water naturally passes from the time of precipitation until it is returned to the atmosphere by evaporation and is again ready to be precipitated.

hydrolysis *hydrolyse* The process by which a substrate is split to form two end products by the intervention of a molecule of water.

hydromorphic soil *sol hydromorphe* A general term for soils that develop under conditions of poor drainage in marshes, swamps, seepage areas, or flats. See also **Gleysolic.**

hydrous mica *mica hydraté* A term used in two different ways: (i) the groups of clay-sized micas that have a higher lattice water content and lower potassium content than ideal mica (illite); (ii) interstratified montmorillonite- and vermiculite-mica minerals in which mica predominates.

hygroscopic coefficient *coefficient hygroscopique* (Obsolete) The weight percentage of water held by, or remaining in, the soil (i) after the soil has been air-dried, or (ii) after the soil has reached equilibrium with an unspecified environment of high relative humidity, usually near saturation, or with a specified relative humidity at a specified temperature.

hygroscopic water *eau hygroscopique* Water adsorbed by a dry soil from an atmosphere of high relative humidity; water lost from an air-dry soil when it is heated to 105 °C; water held by the soil when it is at equilibrium with an atmosphere of a specified relative humidity at a specified temperature, usually 98% relative humidity at 25 °C.

hymatomelanic acid *acide hymatomélanique* The fraction of humus that is soluble in alcohol, after having been extracted with alkali and precipitated with acid, and which, when the alcohol is distilled, forms a brittle mass that is insoluble in alcohol.

I

igneous rock *roche ignée* Rock formed by the cooling and solidification of magma. It has not been changed appreciably since its formation.

illite *illite* A hydrous mica. See also **hydrous mica.**

illuvial horizon *horizon illuvial* A soil horizon in which material carried from an overlying layer has been precipitated from solution or deposited from suspension as a layer of accumulation. See also **eluvial horizon.**

illuviation *illuviation* The process of depositing soil material removed from one horizon in the soil to another, usually from an upper to a lower horizon in the soil profile. Illuviated substances include silicate clay, hydrous oxides of iron and aluminum, and organic matter.

immature soil *sol peu évolué* A soil having indistinct or only slightly developed horizons. Also called juvenile soil.

immobilization *immobilisation* The conversion of an element from the inorganic to the organic form in microbial tissues so that the element is not readily available to other organisms or plants.

impeded drainage *drainage entravé* A condition that hinders the movement of water by gravity through soils.

impervious *imperméable* Resistant to penetration by fluids or roots.

impoverishment, soil *appauvrissement du sol* The process or the result of making the soil less productive.

improvement, soil *amélioration du sol* The processes for, or the results of, making the soil more productive for growing plants, by drainage, irrigation, addition of fertilizers and soil amendments, and so on.

indicator plants *plantes indicatrices* Plants that are characteristic of specific soil or site conditions.

induced pan *pan induit* See **pressure or induced pan.**

indurated layer *couche indurée* A soil layer that has become hardened, generally by cementation of soil particles.

infiltration *infiltration* The downward entry of water into the soil.

infiltration capacity *capacité d'infiltration* (Obsolete) See **infiltration rate.**

infiltration rate *taux d'infiltration, taux maximal d'infiltration* A soil characteristic determining or describing the *maximum* rate at which water can enter the soil under specified conditions, including the presence of excess water. It has the dimensions of velocity (i.e. $cm^3\ cm^{-2}\ sec^{-1} = cm\ sec^{-1}$). It was formerly called infiltration capacity. See also **infiltration velocity.**

infiltration velocity *vitesse d'infiltration* The *actual* rate at which water is entering the soil at a given time. It may be less than the maximum (the infiltration rate), because of a limited supply of water (rainfall or irrigation). It is expressed in the same units that are used for the infiltration rate. See also **infiltration rate.**

infiltrometer *infiltromètre* A device for measuring the rate of entry of fluid into a porous body, for example, water into soil.

inhibition *inhibition* The prevention of growth or multiplication of organisms.

inoculation *inoculation* The artificial introduction of microorganisms into a habitat or their introduction into a culture medium.

inorganic soil *sol inorganique* A soil made up mainly of mineral particles. See **mineral soil.**

intergrade, soil *intergrade, sol de transition* A soil that possesses moderately well-developed distinguishing characteristics of two or more genetically related taxa.

interstratified clay mineral *minéral argileux interstratifié, argile minéralogique interstratifiée* An aggregation composed of random or regular intergrowths of two or more clay minerals.

intrazonal soil *sol intrazonal* A soil having a morphology that shows the influence of some local factor of relief, parent material, or age, rather than of climate and vegetation.

intrinsic permeability *perméabilité intrinsèque* The property of a porous material that is related to the ease with which gases or liquids can pass through it. The Darcy "k" multiplied by $\eta / \rho g$, where

η is the viscosity of the fluid in poises,
ρ is the density of the fluid in g cm^{-3}, and
g is the acceleration of gravity in cm sec^{-2}.

See also **permeability, soil;** and **water, soil.**

ion *ion* Atom, group of atoms, or compound that is electrically charged as a result of the loss of electrons (cation) or the gain of electrons (anion).

ion activity *activité ionique* The effective concentration of a particular ion in a solution or soil-water system. It is expressed analogously to pH, as "pCa," "pNa," and so forth.

iron pan *alios* A thin indurated soil horizon in which iron is a major constituent of the cementing material. Several kinds of cementing materials occur:

I iron – organic matter complexes;
II hydrous oxides of manganese and iron; and
III hydrous iron oxides.

irrigation *irrigation* The artificial application of water to the soil for the benefit of growing crops.

irrigation efficiency *efficacité d'irrigation, rendement de l'irrigation* The ratio of the water actually consumed by crops on an irrigated area to the amount of water diverted from the source onto the area.

irrigation methods *méthodes d'irrigation* The manner in which water is artificially applied to an area. The methods and the manner of applying the water follow:

border-strip par calants, à la planche Water is applied at the upper end of a strip having earthen dikes to confine the water to the strip.

check-basin par bassin de retenue Water is applied rapidly to fairly level plots surrounded by levees. The basin is a small check.

corrugation par infiltration, par billons Water is applied to small, closely spaced furrows, in grain and forage crops, to confine the flow of irrigation water to one direction.

flooding par inondation Water is released from field ditches and allowed to flood over the land.

furrow par rigoles Water is applied to row crops in ditches between the rows made by tillage implements.

sprinkler par aspersion Water is sprayed over the soil surface through nozzles from a pressure system.

subirrigation souterraine Water is applied to open ditches or tile lines until the water table is high enough to wet the soil.

wild flooding par submersion Water is released at high points in the field and distribution is uncontrolled.

isodyne *isodyne* Points of a cultivating implement having equal dynamometer pull; a line on a map of a cultivated field connecting points of equal dynamometer pull.

isomorphous substitution *substitution isomorphe* The replacement of one atom by another of similar size in a crystal lattice without disrupting or changing the crystal structure of the mineral.

kame *kame* An irregular ridge or hill of stratified glacial drift deposited by glacial meltwater.

kaolin group *groupe de la kaolinite* Hydrous aluminosilicates having a 1:1 phyllosilicate structure and no permanent charge.

kettle *marmite, cavité glaciaire* Depression left after the melting of a detached mass of glacier ice buried in drift.

L

L layer *couche L, litière* See **horizon, soil.**

lacustrine deposit *dépôt lacustre* Material deposited in lake water and later exposed either by lowering of the water level or by uplifting of the land. These sediments range in texture from sands to clays.

lagg *lagg, marécage bordier* The depressed margin of a raised bog.

lamina *lame* A unit layer less than 1 cm thick in a stratified sequence.

land *terre* The solid part of the earth's surface or any part thereof. A tract of land is defined geographically as a specific area of the earth's surface. Its characteristics embrace all reasonably stable, or predictably cyclic, attributes of the biosphere vertically above and below this area, including those of the atmosphere, the soil, and the underlying geology, the hydrology, the plant and animal populations, and the results of past and present human activity, to the extent that these attributes exert a significant influence on the present and future uses of land by man.

land classification *classification des terres* The arrangement of land units into various categories based on the properties of the land or its suitability for some particular purpose.

land type *type de terrain* See **association, soil.**

landforms *modelés, formes du terrain* The various shapes of the land surface resulting from a variety of actions such as deposition or sedimentation (eskers, lacustrine basins), erosion (gullies, canyons), and earth crust movements (mountains).

landscape *paysage* All the natural features such as fields, hills, forests, and water that distinguish one part of the earth's surface from another part. Usually it is the portion of land or territory that the eye can see in a single view, including all its natural characteristics.

landslide (landslip) *glissement, éboulement de terrain* (i) A mass of material that has slipped downhill by gravity, often assisted by water when the material is saturated. (ii) Rapid movement of a mass of soil, rock, or debris down a slope.

latitude zonation *zones de latitude, zonalité horizontale* Latitudinal (normal) zonation of soils. See also **vertical zonation.**

lattice energy *énergie de réseau* The energy required to separate the ions of a crystal to an infinite distance from each other.

lattice structure *structure maillée, réticulée, en grille* The orderly arrangement of atoms in a crystalline material.

leaching *lessivage* The removal from the soil of materials in solution. See also **eluviation.**

levee *levée, digue* A natural or artificial embankment along a river or stream.

lichen *lichen* A symbiotic, mutualistic association of an algal type and a fungal type.

lime, agricultural *chaux* A soil amendment consisting principally of calcium carbonate, and including magnesium carbonate and perhaps other materials. It is used to supply calcium and magnesium as essential elements for growth of plants and to neutralize soil acidity.

lime concretion *concrétion calcaire* An aggregate of precipitated calcium carbonate or other material cemented by precipitated calcium carbonate.

lime potential *potentiel de chaux* The negative logarithm of the ratio of the hydrogen ion activity to the square root of the sum of the activities of calcium and magnesium in the soil solution. It is generally written as $pH - \frac{1}{2}p(Ca + Mg)$. It can also be written as $\frac{1}{2} \log [(Ca + Mg)(OH)^2] + pK_w$, where K_w is the ionic product of water. Lime potential is an expression of the sum of the activities of calcium and magnesium hydroxides in the soil solution. See also **corrected lime potential.**

lime requirement *besoin en chaux* The amount of agricultural limestone, or the equivalent of another liming material, required per hectare to a soil depth of 15 cm (or for 2,240 t of soil) to raise the pH of the soil to a specific value under field conditions.

limno layer *couche limnique* In organic soil, a layer at least 5 cm (2 inches) thick composed of marl, diatomaceous earth, or coprogenous earth (sedimentary peat).

liquefaction (spontaneous liquefaction) *liquéfaction spontanée* The sudden large decrease of the shearing resistance of a cohesionless soil. It is caused by a collapse of the structure by shock or other strain and is associated with a sudden, temporary increase of the interstitial water pressure. It involves a temporary transformation of the material into a fluid mass. See also **quick clay.**

liquid limit (upper plastic limit, Atterberg limit) *limite de liquidité, limite supérieure de plasticité, limite d'Atterberg* (i) The water content corresponding to an arbitrary limit between the liquid and plastic states of consistence of a soil. (ii) The water content at which a pat of soil, cut by a standard-sized groove, will flow together for a distance of 12 mm under the impact of 25 blows in a standard liquid-limit apparatus.

lithic layer *couche lithique* Bedrock under the control section of a soil. In Organic soils, bedrock occurring within a depth of between 10 cm (4 inches) and 160 cm (64 inches) from the surface.

lithosequence *lithoséquence* A group of related soils that differ from each other in certain properties, primarily because of differences in the parent rock.

loam *loam* A soil textural class. See also **texture, soil.**

loamy *loameux* Intermediate in texture and properties between fine-textured and coarse-textured soils. It includes all textural classes having "loam" or "loamy" as a part of the class name, such as clay loam or loamy sand. See also **loam** and **texture, soil.**

loamy coarse sand *sable grossier loameux* See **texture, soil.**

loamy fine sand *sable fin loameux* See **texture, soil.**

loamy sand *sable loameux* See **texture, soil.**

loamy very fine sand *sable très fin loameux* See **texture, soil.**

loess *loess* Material transported and deposited by wind and consisting of predominantly silt-sized particles.

loose *meuble* A soil consistence term. See also **consistence.**

lower plastic limit *limite inférieure de plasticité* See **plastic limit.**

Luvic Gleysol *gleysol luvique* A great group of soils in the Gleysolic order developed under wet conditions, under grass or forest or both. The soils have Aeg and Btg horizons.

Luvisolic *luvisolique* An order of soils that have eluvial (Ae) horizons, and illuvial (Bt) horizons in which silicate clay is the main accumulation product. The soils developed under forest or forest-grassland transition in a moderate to cool climate.

lysimeter *lysimètre* (i) A device for measuring percolation and leaching losses of water and solutes from a column of soil under controlled conditions. (ii) A device for measuring gains (precipitation and condensation) and losses (evapotranspiration) of water by a column of soil.

macronutrient *élément majeur* A chemical element necessary in large amounts, usually greater than 1 ppm in the plant, for the growth of plants and usually applied artificially in fertilizer or liming materials. Macro refers to the quantity and not to the essentiality of the element to the plant. See also **micronutrient.**

macroscopic velocity *vélocité macroscopique* See **flow velocity.**

made land *terrain anthropique, terre rapportée* Areas filled with earth, or earth and trash mixed, usually by or under the control of man. A miscellaneous land type.

management, soil *gestion du sol* (i) The total of all tillage operations, cropping practices, fertilizer, lime, and other treatments conducted on or applied to a soil for the production of plants. (ii) The division of soil science dealing with the items listed in (i).

management groups, soil *classes (groupes) de gestion des sols* Groups of soil units having similar adaptations or management requirements for one or more specific purposes, such as adapted crops or crop rotations, drainage practices, fertilization, forestry, and highway engineering.

manure *fumier, fumure* The excreta of animals, with or without the admixture of bedding or litter, in varying stages of decomposition. It is also called barnyard manure or stable manure. This is the usual meaning in North America. In some countries manure is used to refer to any fertilizer.

map, soil *carte pédologique* (Pedology) A map showing the distribution of soil types or other soil mapping units related to the prominent physical and cultural features of the earth's surface. Descriptions of five kinds of soil maps follow.

detailed soil map carte pédologique détaillée A soil map showing the boundaries between soil types or complexes of intimately associated soil types. The scale of the map depends on the purpose of the map, the intensity of land use, the pattern of soils, and the scale of other cartographic materials available. Traverses are usually made at ½-km (¼-mile) intervals, or more frequently. The scale commonly used for field mapping is 1:10,000 to 1:25,000.

detailed reconnaissance soil map carte pédologique de reconnaissance détaillée A map showing the distribution of soils and physical features as determined by traversing the area at intervals of 1 to 2 km (½ to 1 mile). The scale, depending on the detail required, is 1:50,000 to 1:125,000.

generalized soil map carte pédologique de généralisation A small-scale soil map showing the general distribution of soils within a large area in less detail than on a detailed soil map.

reconnaissance soil map carte pédologique de reconnaissance A map, with less detail than the detailed reconnaissance map, showing the general distribution of soils determined by traverses at intervals of 2 to 4 km (1 to 2 miles). The scale is generally 1:125,000 to 1:250,000.

schematic soil map carte pédologique schématique A soil map compiled from scant knowledge of the soils of new and undeveloped regions by applying available information about the soil-formation factors of the area. The scale is usually 1:500,000 or smaller. See also **soil-formation factors.**

marl *marne* A soft, unconsolidated earthy deposit consisting of calcium carbonate or magnesium carbonate, or both, and often shells, usually mixed with varying amounts of clay or other impurities.

marsh *marais* Periodically flooded or continually wet areas having the surface not deeply submerged. It is covered dominantly with sedges, cattails, rushes, or other hydrophytic plants. Subclasses include freshwater and saltwater marshes. See also **swamp.**

mass wasting *mouvement en masse* A general term for a variety of processes by which large masses of earth material are moved by gravity from one place to another.

matric potential *potentiel capillaire, de matrice* See **water, soil.**

matrix, soil *matrice du sol* The main soil constituent or material that encloses other soil features, for example, concretions embedded in a fine-grained matrix.

mature soil *sol évolué, sol mûr* A soil having well-developed soil horizons produced by the natural processes of soil formation.

maximum water-holding capacity *capacité maximale de rétention d'eau* The average moisture content of a disturbed sample of soil, 1 cm high, that is at equilibrium with a water table at its lower surface.

mechanical analysis *analyse mécanique* See **particle-size analysis** and **particle-size distribution.**

mechanics and engineering, soil *mécanique et génie du sol, mécanique des sols* The subspecialization of soil science dealing with the effect of forces on the soil and the application of engineering principles to problems involving the soil.

medium texture *texture moyenne* Intermediate between fine-textured and coarse-textured soils. It includes the following textural classes: very fine sandy loam, loam, silt loam, and silt.

Melanic Brunisol *brunisol mélanique* A great group of soils in the Brunisolic order. The soils have mull Ah horizons thicker than 5 cm (2 inches) and base-saturated Bm horizons. This group includes soils formerly classified as Brown Forest.

mellow soil *sol meuble* A very soft, very friable, porous soil having no tendency toward hardness or harshness. See also **consistence.**

mesa *mesa* A rather flat-topped, steep-sided hill or mountain that is usually composed of nearly horizontal strata of bedrock.

mesic layer *couche mésique* A layer of organic material at a stage of decomposition between that of the fibric and humic layers.

Mesisol *mésisol* A great group of soils in the Organic order that are saturated for most of the year. The soils have a dominantly mesic middle tier, or middle and surface tiers if a terric, lithic, hydric, or cryic contact occurs in the middle tier.

mesophile *mésophile* An organism growing best at moderate temperatures of 25 to 40°C.

metamorphic rock *roche métamorphique* Rock derived from preexisting rocks, but differing from them in physical, chemical, and mineralogical properties as a result of natural geological processes, principally heat and pressure, originating within the earth. The preexisting rocks may have been igneous, sedimentary, or another form of metamorphic rock.

mica *mica* A mineral group consisting of phyllosilicates having sheetlike 2:1 lattice structures, generally with potassium in the interlayer position.

microaerophile *micro-aérophile* A microorganism growing best in the presence of small amounts of atmospheric oxygen.

microbiology, soil *microbiologie du sol* The subspecialization of soil science dealing with soil-inhabiting microorganisms and their relationship to agriculture, including both plant and animal growth.

microclimate *microclimat* (i) The climate of a small area resulting from the modification of the general climate by local differences in elevation or exposure. (ii) The sequence of atmospheric changes within a very small region.

M

microfauna *microfaune* The part of the animal population consisting of individuals that are too small to be clearly distinguished without the use of a microscope. It includes protozoa and nematodes.

microflora *microflore* The part of the plant population consisting of individuals that are too small to be clearly distinguished without the use of a microscope. It includes algae, bacteria, and fungi.

micronutrient *oligo-élément* A chemical element necessary in only small amounts, usually less than 1 ppm in the plant, for the growth of plants and the health of animals. Examples of these elements are boron, molybdenum, copper, iron, manganese, and zinc. "Micro" refers to the amount, not the essentiality of the element to the organism. See also **macronutrient.**

microorganism *micro-organisme* A form of life of microscopic size.

microrelief *microrelief* Small-scale, local differences in relief, including mounds, swales, or hollows. See also **cradle knoll** and **gilgai.**

midden *tertre, butte-témoin* A refuse heap marking the site of previous habitation.

mine dump *terril* Area covered with overburden and other waste materials from ore and coal mines, quarries, and smelters, and usually having little or no vegetative cover. A miscellaneous land type.

mine wash *boue de mines* Water-deposited accumulations of sandy, silty, or clayey material recently eroded in mining operations. It may clog streams and channels, and damage land on which it is deposited. A miscellaneous land type.

mineral *minéral* A homogeneous naturally occurring phase, sometimes restricted to inorganic, crystalline phases.

mineral soil *sol minéral* A soil consisting predominantly of, and having its properties determined predominantly by, mineral matter. It contains less than 17% organic carbon except for an organic surface layer that may be up to 40 cm (16 inches) thick if formed of mixed peat (bulk density 0.1 or more) or 60 cm (24 inches) if of fibric moss peat (bulk density less than 0.1).

mineral, soil *minéral du sol* (i) Any mineral occurring as a part of or in the soil. (ii) A natural inorganic compound with definite physical, chemical, and crystalline properties (within the limits of isomorphism) occurring in the soil. See also **clay mineral.**

mineralization *minéralisation* The conversion of an element from an organic form to an inorganic state as a result of microbial decomposition.

mineralogical analysis *analyse minéralogique* The estimation or determination of the kinds or amounts of minerals present in a rock or a soil.

mineralogy, soil *minéralogie du sol* The subspecialization of soil science dealing with the homogeneous inorganic materials found in the earth's crust to the depth of weathering or sedimentation.

minor element *élément mineur* See **micronutrient.**

miscellaneous land type *type de terrains divers* A mapping unit for areas of land that have little or no natural soil, or that are inaccessible for orderly examination, or where, for some reason, it is not feasible to classify the soil, for example, rough mountainous land, eroded slopes, and marshes.

moder *moder* A zoogenous forest humus form made up of plant remains partly disintegrated by the soil fauna (F layer), but not matted as in raw humus. It is transitional to a zone of spherical or cylindrical microdejections of arthropods that is permeated by loose mineral particles in its lower part and often throughout. Although incorporation of organic matter is intense, it is shallow, because none of the organisms concerned with moder formation have important burrowing activity. The mixing of organic and mineral particles is purely mechanical. Organic carbon under the F layer varies from 23% to 29%, but may exceed 35%. The C:N ratio is 20 to 25 and sometimes lower. Various subgroups can be recognized by their morphology and chemical characteristics.

moderately coarse texture *texture modérément grossière* Consisting predominantly of coarse particles. In soil textural classification, it includes all the sandy loams except the very fine sandy loam. See also **coarse texture.**

moderately fine texture *texture modérément fine* Consisting predominantly of intermediate-sized soil particles with or without small amounts of fine or coarse particles. In soil textural classification, it includes clay loam, sandy clay loam, and silty clay loam. See also **fine texture.**

moisture equivalent *humidité équivalente* The weight percentage of water retained by a previously saturated sample of soil, 1 cm thick, after it has been subjected to a centrifugal force of 1000 times gravity for 30 min.

moisture, soil *humidité du sol* Water contained in the soil.

moisture tension, soil *tension de l'eau du sol* In soils partially saturated with water there is moisture tension, which is equal in magnitude but opposite in sign to the soil water pressure. Moisture tension is equal to the pressure that must be applied to the soil water to bring it to a hydraulic equilibrium, through a porous permeable wall or membrane, with a pool of water of the same composition. See also **water, soil.**

The pressures used and the corresponding percentages most commonly determined are:

15-atmosphere percentage pourcentage à 15 atmosphères The percentage of water contained in a soil that has been saturated, subjected to, and is in equilibrium with, an applied pressure of 15 atm. Pressure is applied in a pressure membrane or ceramic pressure plate apparatus. It is usually expressed as a weight percentage, but may be expressed as a volume percentage. It is approximately the same as 15-bar percentage.

15-bar percentage pourcentage à 15 bars The percentage of water contained in a soil that has been saturated, subjected to, and is in equilibrium with an applied pressure of 15 bars. Pressure is applied in a pressure membrane or ceramic plate apparatus. It is usually expressed as a weight percentage, but may be expressed as a volume percentage. It is approximately the same as 15-atmosphere percentage.

⅓-atmosphere percentage pourcentage à ⅓ atmosphère The percentage of water contained in a soil that has been saturated, subjected to, and is in equilibrium with an applied pressure of ⅓ atm. Pressure is applied in a ceramic plate apparatus. It is usually expressed as a weight percentage, but may be expressed as a volume percentage. It is approximately the same as ⅓-bar percentage. Also, for medium- to coarse-textured soils it is approximately numerically equal to moisture equivalent.

⅓-bar percentage pourcentage à ⅓ bar The percentage of water contained in a soil that has been saturated, subjected to, and is in equilibrium with an applied pressure of ⅓ bar. Pressure is applied in a ceramic plate apparatus. It is usually expressed as a weight percentage and is approximately the same as ⅓-atmosphere percentage. Also, for medium- to coarse-textured soils it is approximately numerically equal to moisture equivalent.

60-centimetre percentage pourcentage à 60 centimètres The percentage of water contained in a soil that has been saturated, subjected to, and is in equilibrium with an

applied pressure or tension equivalent to a column of water 60 cm high. Pressure may be applied in a pressure plate apparatus or, as a tension, on a tension table. It may be expressed on a weight or volume basis and is considered by many to approximate the "field capacity," especially in medium- to coarse-textured soils.

moisture-release curve *courbe de désorption* See **moisture-retention curve.**

moisture-retention curve *courbe de rétention d'eau* A graph showing the soil-moisture percentage (by weight or by volume) versus applied tension or pressure. Points on the graph are usually obtained by increasing or decreasing the applied tension or pressure over a specified range.

moisture-volume percentage *pourcentage d'eau en volume* The ratio of the volume of water in a soil to the total bulk volume of the soil.

moisture-weight percentage *pourcentage d'eau en poids* The moisture content expressed as a percentage of the ovendry weight of soil. See also **dry-weight percentage.**

monolith, soil *monolithe* A vertical section of a soil profile removed from the soil and mounted for display or study.

montmorillonite *montmorillonite* A specific aluminous member of the smectite group.

montmorillonite group *groupe de la montmorillonite* Clay minerals having a 2:1 expanding crystal lattice. Isomorphous substitution gives the various types and causes a net permanent charge balanced by cations in such a manner that water may move between the sheets, giving reversible cation exchange and very plastic properties. Synonymous with smectite.

mor (or raw humus) *mor, humus brut* A nonzoogenous forest humus form distinguished by a matted F layer and a holorganic H layer with a sharp delineation from the A horizon. It is generally acid, having high organic carbon content (52% or more) and a high C:N ratio (25–35, sometimes higher). Various subgroups can be recognized by the morphology, and chemical and biological properties.

moraine *moraine* An accumulation of earth, generally with stones, carried and finally deposited by a glacier. Several kinds of moraines are distinguished, such as ground moraine and end moraine.

morphology, soil *morphologie du sol* (i) The physical constitution, particularly the structural properties, of a soil profile as exhibited by the kinds, thickness, and arrangement of the horizons in the profile, and by the texture, structure, consistence, and porosity of each horizon. (ii) The structural characteristics of the soil or any of its parts.

mottled zone *zone de marbrures, de mouchetures, zone marmorisée* A layer that is marked with spots or blotches of different color or shades of color. The pattern of mottling and the size, abundance, and color contrast of the mottles may vary markedly and should be specified in the soil description.

mottles *marbrures, mouchetures, taches* Spots or blotches of different color or shades of color interspersed with the dominant color.

mottling *marmorisation, marbrures* Formation or presence of mottles in the soil.

muck soil *terre noire, organique* An organic soil consisting of highly decomposed materials. Mucky peat and peaty muck are terms used to describe increasing stages of decomposition between peat and muck.

mudflow slide *coulée de boue, d'argile* Movement of large masses of "quick clay."

mulch *mulch, paillis* Any material such as straw, sawdust, leaves, plastic film, or loose soil that is spread on the surface of the soil to protect the soil and the plant roots from the effects of raindrops, soil crusting, freezing, and evaporation.

mulch, to *pailler* To apply a mulch to the surface of the soil.

mulch farming *culture par paillis* A system of farming in which the organic residues are not plowed into or mixed with the soil, but are left on the surface as a mulch.

mull *mull* A zoogenous forest humus form consisting of an intimate mixture of well-humified organic matter and mineral soil that makes a gradual transition to the horizon underneath. It is distinguished by its crumb or granular structure, and because of the activity of the burrowing microfauna (mostly earthworms), partly decomposed organic debris does not accumulate as a distinct layer (F layer) as in mor and moder. The organic matter content is 5–20% and the C:N ratio is 10–15. Various subgroups can be distinguished by the morphology and chemical characteristics. Ah horizon.

Munsell color system *code de couleurs Munsell* A color designation system specifying the relative degrees of the three simple variables of color: hue, value, and chroma. For example: 10YR 6/4 is the color of a soil having a hue of 10YR, value of 6, and chroma of 4. These notations can be translated into several different systems of color names. See also **chroma, hue,** and **value, color.**

mycelium *mycélium* A mass of threadlike filaments, branched or composing a network, that constitutes the vegetative structure of a fungus.

mycorrhiza *mycorhize* The association, usually symbiotic, of fungi with the roots of seed plants. See also **ectotrophic mycorrhiza** and **endotrophic mycorrhiza.**

N, O

natural erosion *érosion naturelle* See **erosion (ii)**.

neutral soil *sol neutre* A soil in which the surface layer, to plow depth, is neither acid nor alkiaine in reaction. See also **acid soil; alkaline soil; pH, soil;** and **reaction, soil.**

nitrate reduction *réduction des nitrates* The biochemical reduction of nitrate.

nitrification *nitrification* The biochemical oxidation of ammonium to nitrate.

nitrogen assimilation *assimilation de l'azote* The incorporation of nitrogen into organic cell substances by living organisms.

nitrogen cycle *cycle de l'azote* The sequence of biochemical changes by which nitrogen is used by a living organism, liberated upon the death and decomposition of the organism, and converted to its original state of oxidation.

nitrogen fixation *fixation de l'azote* The conversion of elemental nitrogen (N_2) to organic combinations or to forms readily utilizable in biological processes.

nodule, soil *nodule de sol* A rounded unit within the soil matrix that differs from the surrounding material because of the concentration of some constituent or a change in fabric.

noncapillary porosity *porosité non capillaire* (Obsolete) See **air porosity.**

normal erosion *érosion normale* See **erosion (ii)**.

oil wasteland *terrain d'épandage de pétrole* Land on which oily wastes have accumulated, including slush pits and adjacent areas affected by oil waste. A miscellaneous land type.

one-third atmosphere percentage *pourcentage à ⅓ atmosphère* See **moisture tension, soil.**

one-third bar percentage *pourcentage à ⅓ bar* See **moisture tension, soil.**

order, soil *ordre de sols* A category in the Canadian system of soil classification. All the soils of Canada have been divided into eight orders: Chernozemic, Solonetzic, Luvisolic, Podzolic, Brunisolic, Regosolic, Gleysolic, and Organic. All the soils within an order have one or more characteristics in common.

Organic *organique* An order of soils that have developed dominantly from organic deposits. The majority of Organic soils are saturated for most of the year, unless artificially drained, but some of them are not usually saturated for more than a few days. They contain 17% or more organic carbon, and:

1) if the surface layer consists of fibric organic material and the bulk density is less than 0.1 [with or without a mesic or humic Op less than 15 cm (6 inches) thick], the organic material must extend to a depth of at least 60 cm (24 inches); or
2) if the surface layer consists of organic material with a bulk density of 0.1 or more, the organic material must extend to a depth of at least 40 cm (16 inches); or
3) if a lithic contact occurs at a depth shallower than stated in 1) or 2) above, the organic material must extend to a depth of at least 10 cm (4 inches).

organic matter, soil *matière organique du sol* The organic fraction of the soil; includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population. It is usually determined on soils that have been sieved through a 2.0-mm sieve.

organic phosphorus *phosphore organique* Phosphorus present as a constituent of an organic compound, or a group of organic compounds such as glycerophosphoric acid, inositol phosphoric acid, and cytidylic acid.

ortstein *ortstein* (i) An indurated layer in the B horizon of Podzols in which the cementing material consists of illuviated sesquioxides and organic matter. (ii) As a subgroup of Podzolic soils, Ortstein indicates a Bhfc or Bfc horizon that is strongly cemented, occurs over at least one-third of the exposure, and is at least 2.5 cm (1 inch) thick.

osmotic potential *potentiel osmotique* See **water, soil.**

osmotic pressure *pression osmotique* See **water, soil.**

outwash *épandage fluvio-glaciaire* Sediments washed out by flowing water beyond the glacier and laid down as stratified drift in thin foreset beds. The particle size may vary from boulders to silt.

ovendry soil *sol séché à l'étuve* Soil that has been dried at 105°C until it has reached constant weight.

overconsolidated soil deposit *dépôt de sol surcompacté* A soil deposit that has been subjected to an effective pressure greater than the present overburden pressure.

pans *pans* Horizons or layers in soils that are strongly compacted, indurated, or very high in clay content. See also **caliche, claypan, fragipan, genetic pan, iron pan,** and **pressure or induced pan.**

parent material *matériau originel, parental* The unconsolidated and more or less chemically weathered mineral or organic matter from which the solum of a soil has developed by pedogenic processes.

parent rock *roche-mère* The rock from which the parent materials of soils are formed.

partial sterilization *stérilisation partielle* The elimination of a portion of a population of microorganisms, usually by heat or chemical treatment. The process is selective, and certain organisms or groups of organisms are destroyed to a greater extent than others.

particle density *densité particulaire* The mass per unit volume of the soil particles. It is usually expressed in grams per cubic centimetre. Has been called grain density. See also **bulk density, soil.**

particle size *granulométrie* The effective diameter of a particle measured by sedimentation, sieving, or micrometric methods. Has been called grain size.

particle-size analysis *analyse granulométrique* The determination of the various amounts of the different separates in a soil sample, usually by sedimentation, sieving, micrometry, or combinations of these methods. Has been called grain-size analysis or mechanical analysis.

particle-size distribution *répartition granulométrique* The amounts of the various soil separates in a soil sample, usually expressed as weight percentages. Has been called grain-size distribution.

parts per million (ppm) *parties par million (ppm)* Weight units of any given substance per one million equivalent weight units of ovendry soil; or, for soil or other solutions, the weight units of solute per million weight units of solution.

peat *tourbe* Unconsolidated soil material consisting largely of undecomposed, or only slightly decomposed, organic matter.

peat soil *sol tourbeux* An organic soil having no, or only slight, decomposition.

ped *ped, agrégat naturel* A unit of soil structure such as a prism, block, or granule, which is formed by natural processes, in contrast with a clod, which is formed artificially.

pedogenesis *pédogénèse* See **genesis, soil (i).**

pedology *pédologie* The aspects of soil science dealing with the origin, morphology, genesis, distribution, mapping, and taxonomy of soils, and classification in terms of their use. See also **science, soil.**

peneplain *pénéplaine* A rugged area that was high at one time, but has been reduced by erosion to a low, gently rolling surface resembling a plain.

penetrability *pénétrabilité* The ease with which a probe can be pushed into the soil. It may be expressed in units of distance, speed, force, or work, depending on the type of penetrometer used.

perched water table *nappe d'eau perchée* A water table due to the "perching" of water on a relatively impermeable layer at some depth within the soil. The soil within or below the impermeable layer is not saturated with water.

percolation (of soil water) *percolation (de l'eau du sol)* The downward movement of water through soil; specifically, the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of 1.0 or less.

periglacial *périglaciaire* Indicative of all cold-climate processes, whether or not they occur in the immediate vicinity of glaciers.

permafrost *pergélisol* (i) Perennially frozen material underlying the solum. (ii) A perennially frozen soil horizon.

permafrost table *limite du pergélisol* The upper boundary of permafrost, usually coincident with the lower limit of seasonal thaw. See also **permafrost (i).**

permanent charge *charge permanente* The net negative or positive charge of clay particles inherent in the crystal lattice of the particle. It is not affected by changes in pH or by ion-exchange reactions.

permeability, soil *perméabilité du sol* (i) The ease with which gases and liquids penetrate or pass through a bulk mass of soil or a layer of soil. Because different soil horizons vary in permeability, the specific horizon should be designated. (ii) The property of a porous medium that relates to the ease with which gases or liquids can pass through it. Previously, it was considered to be the "k" in Darcy's law. It is the "K" in intrinsic permeability. See also **intrinsic permeability, Darcy's law,** and **water, soil.**

pesticides *pesticides* Chemicals that kill organisms that are injurious to man or to the crops and animals upon which he depends for food, fiber, and shelter. These organisms include insects, mites, microorganisms, weeds, and rodents. Pesticides include insecticides, fungicides, herbicides, and others.

pF *pF* (Obsolete) The logarithm of the soil-moisture tension measured by the height in centimetres of a column of water that produces a tension of equal force.

pH, soil *pH du sol* The negative logarithm of the hydrogen-ion activity of a soil. The degree of acidity or alkalinity of a soil as determined by means of a glass, quinhydrone, or other suitable electrode or indicator at a specified moisture content or soil–water ratio, and expressed in terms of the pH scale.

pH-dependent cation exchange capacity *capacité d'échange cationique dépendant du pH* The difference between the effective cation exchange capacity and the cation exchange capacity of a soil measured at a pH higher than that of its natural value.

phase, soil *phase du sol* A subdivision of a soil type or other unit of classification having characteristics that affect the use and management of the soil, but that do not vary sufficiently to differentiate it as a separate type. A variation in a property or characteristic such as degree of slope, degree of erosion, or content of stones.

photomap *photo-carte* A mosaic map made from aerial photographs showing physical and cultural features as on a planimetric map. See also **planisaic** and **toposaic.**

phyllosilicates *phyllosilicates* Silicate structures in which the SiO_4 tetrahedra are linked together in infinite two-dimensional sheets and are condensed with layers of AlO or MgO octahedra in the ratio 2:1 or 1:1. Isomorphous substitution of certain elements often occurs.

physical properties of soils *propriétés physiques du sol* The characteristics, processes, or reactions of a soil that are caused by physical forces, and are described by, or expressed in, physical terms or equations. Sometimes physical properties are confused with and hard to separate from chemical properties; hence, the terms "physical-chemical" or "physicochemical." Examples of physical properties are bulk density, water-holding capacity, hydraulic conductivity, porosity, and pore-size distribution.

physical weathering *altération physique* The breakdown of rock and mineral particles into smaller particles by physical forces such as frost action and wind. See also **weathering.**

P

physisorption *physisorption* The process of attachment of nonionic substances such as polar water molecules, acetic acid molecules, or nucleic acids to clays or other solid-phase surfaces. The attachment of large molecules to clay particles by ionic processes is not physisorption.

phytogenic soils *sols phytogéniques, sols phytogènes* (Obsolete) Soils developed under the dominant influence of natural vegetation, mainly in temperate regions.

phytometer *phytomètre* A plant or group of plants used to measure the physical factors of the habitat in terms of physiological activities.

phytomorphic soils *sols phytomorphes* Well-drained soils of an association that have developed under the dominant influence of the natural vegetation characteristic of a region. The zonal soils of an area.

piedmont *piémont* At or near the foot of a mountain.

piezometer *piézomètre* An instrument for measuring the pressure head of liquids.

piezometric surface *surface piézométrique* The surface at which water will stand in a series of piezometers.

pile *pieu* A slender structural element that is driven, or introduced by other means, into the soil, usually to provide vertical or lateral support.

placic *placique* Pertaining to a thin black to dark reddish pan or horizon and presumably cemented by iron.

planisaic *photo-carte planimétrique* A photomap in which the planimetric detail is shown by overprints in color. See also **photomap** and **toposaic.**

plastic limit (Atterberg limit) *limite de plasticité, limite d'Atterberg* (i) The water content corresponding to an arbitrary limit between the plastic and the semisolid states of consistence of a soil. (ii) The water content at which a soil will just begin to crumble when rolled into a thread approximately 3 mm in diameter.

plastic soil *sol plastique* A soil capable of being molded or deformed continuously and permanently into various shapes by moderate pressure. See also **consistence.**

plasticity constants *constantes de plasticité* See **liquid limit, plastic limit,** and **plasticity number.**

plasticity number *indice de plasticité* The numerical difference between the liquid limit and the plastic limit, or, synonymously, between the lower plastic limit and the upper plastic limit. Sometimes called "plasticity index."

plasticity range *intervalle de plasticité* The range of moisture weight percentage within which a small sample of soil exhibits plastic properties.

plate count *numération sur plaque* A count of the number of colonies formed on a culture medium that has been inoculated with a small amount of soil in order to estimate the number of certain organisms present in the soil sample.

platy *lamellaire* Consisting of soil aggregates that have developed predominantly along the horizontal axes; laminated; flaky. See also **structure types, soil.**

plow pan (plow sole) *semelle de labour* See **pressure or induced pan.**

Podzol *podzol* Before 1968, Podzol was a great group in the Podzolic order that included soils having Ae and podzolic B horizons. See also **Podzolic.**

Podzolic *podzolique* An order of soils having podzolic B horizons (Bh, Bhf, or Bf) in which amorphous combinations of organic matter (dominantly fulvic acid), Al, and usually Fe are accumulated. The sola are acid and the B horizons have a high pH-dependent charge. The great groups in the order are Humic Podzol, Ferro-Humic Podzol, and Humo-Ferric Podzol.

podzolic B *B podzolique* Consists of one or more of Bf, Bhf, and Bh. See also **horizon, soil.**

podzolization *podzolisation* A process of soil formation resulting in the genesis of Podzolic soils.

population, soil *population du sol* All the organisms living in the soil, including plants and animals.

pore space *espace porifère* The total space not occupied by soil particles in a bulk volume of soil.

pores, soil *pores du sol* The part of the bulk volume of soil not occupied by soil particles. Interstices or voids.

pore-size distribution *répartition volumétrique des pores* The volume of the various sizes of pores in a soil. They are expressed as percentages of the bulk volume (soil plus pore space).

porosity *porosité* The volume percentage of the total bulk not occupied by solid particles.

potassium fixation *fixation du potassium* The process of converting exchangeable or water-soluble potassium to moderately soluble potassium; that is, to a form not easily exchanged from the adsorption complex with a cation of a neutral salt solution.

potassium-supplying power of soils *pouvoir de libération de potassium du sol* The capacity of soil to supply potassium to growing plants from both the exchangeable and the moderately available forms.

potential acidity *acidité potentielle* In a soil, the amount of exchangeable hydrogen ion that can be made free or active in the soil solution by cation exchange. It is usually expressed in milliequivalents per unit mass of soil.

potential cation exchange capacity *capacité d'échange cationique potentielle* The total number of cations that a soil can adsorb at a specified pH.

potential evapotranspiration *évapotranspiration potentielle* See **evapotranspiration.**

precipitation interception *interception des précipitations* The stopping, interrupting, and temporary holding of precipitation in any form by a vegetative canopy or vegetation residue.

preconsolidation pressure (or prestress) *pression de contrainte* The greatest effective pressure to which a soil has been subjected.

pressure membrane *membrane de tensiomètre* A membrane, permeable to water and only very slightly permeable to gas when wet, through which water can escape from a soil sample in response to a pressure gradient.

pressure or induced pan *pan de pression, pan induit* A subsurface horizon or soil layer having a higher bulk density and a lower total porosity than the soil directly above or below it, as a result of pressure that has been applied by normal tillage operations or other artificial means. It is also referred to as plow pan, plow sole, or traffic pan.

primary mineral *minéral primaire* A mineral that has not been altered chemically since deposition and crystallization from molten lava. See also **secondary mineral.**

primary particles *particules primaires, élémentaires* Individual soil particles after a standard dispersion treatment.

prismatic *prismatique* A soil structure type having prismlike aggregates that have vertical axes much longer than the horizontal axes. See also **structure types, soil.**

productive soil *sol productif* A soil in which the chemical, physical, and biological conditions are favorable for the economical production of crops suited to a particular area.

productivity, soil *productivité du sol* The capacity of a soil, in its normal environment, to produce a specified plant or sequence of plants under a specified system of management. The "specified" limitations are needed because no soil can produce all crops with equal success and a single system of management cannot produce the same effect on all soils. Productivity means the capacity of soil to produce crops and is expressed in terms of yields.

profile, soil *profil de sol* A vertical section of the soil through all its horizons and extending into the parent material.

protozoa *protozoaires* Unicellular organisms belonging to the animal kingdom.

psammophytes *psammophytes* Plants that grow best in or tolerate sand, particularly fine to medium sand.

psychrophile *psychrophile* A microorganism capable of thriving at temperatures as low as 0°C.

pure culture *culture pure* A nutrient medium containing the growth of a single strain of an organism free from other living species or strains.

Q, R

quick clay *argile sensible* Clayey material having the tendency to change from a relatively stiff condition to a liquid mass when it is disturbed. See also **liquefaction (spontaneous liquefaction).**

quicksand *sable mouvant* Sand of low bearing capacity caused by the upward flow of water and the resultant decrease in intergranular pressure.

R layer *couche R* Underlying consolidated bedrock. See also **horizon, soil.**

rainfall interception *interception de la pluie* See **precipitation interception.**

raw humus *humus brut* See **mor.**

reaction, soil *réaction du sol* The degree of acidity or alkalinity of a soil, usually expressed as a pH value. Descriptive terms commonly associated with certain ranges in pH are: extremely acid, less than 4.5; very strongly acid, 4.5–5.0; strongly acid, 5.1–5.5; moderately acid, 5.6–6.0; slightly acid, 6.1–6.5; neutral, 6.6–7.3; slightly alkaline, 7.4–7.8; moderately alkaline, 7.9–8.4; strongly alkaline, 8.5–9.0; and very strongly alkaline, greater than 9.0.

regolith *régolithe* The unconsolidated mantle of weathered rock and soil material overlying solid rock.

Regosol *régosol* The only great group in the Regosolic order. The soils in the group have insufficient horizon development to meet the requirements of the other orders.

Regosolic *régosolique* An order of soils having no horizon development or development of the A and B horizons insufficient to meet the requirements of the other orders. Regosol is the only great group in this order.

relief *relief* Elevations or inequalities of a land surface, considered collectively. Land having no unevenness or differences of elevation is called level; gentle relief is called undulating, strong relief, rolling, and very strong relief, hilly. See also **microrelief.**

rendzina *rendzine* A group of soils having brown to black surface horizons, which have developed on parent material that contains more than 40% calcium carbonate equivalent. Not used in Canadian taxonomy.

residual material *matériau résiduel* Unconsolidated and partly weathered mineral materials formed by the disintegration of consolidated rock in place.

residual shrinkage *retrait résiduel* The decrease in volume after the proportionality between water loss and volume change ceases.

residual soil *sol résiduel* Soil formed from, or resting on, consolidated rock of the same kind as that from which it was formed and in the same location.

retentivity profile, soil *courbe de rétention* A graph showing the retaining capacity of a soil as a function of depth. The retaining capacity may be for water, for water at any given tension, for cations, or for any other substances held by soils.

reversion *réversion, rétrogradation* Changing of essential plant nutrient elements from soluble to less soluble forms by interaction with or reactions in the soil. Reversion is usually restricted to the conversion of monocalcium phosphate to the less soluble dicalcium phosphate.

reworked *remanié* Descriptive of material modified after its preliminary deposition, commonly by water or wind.

rhizobia *rhizobium(s)* Small heterotrophic bacteria of the genus *Rhizobium* capable of forming symbiotic nodules on the roots of leguminous plants. In the nodules the bacteria fix atmospheric nitrogen that is used by the plants. The bacteria receive their energy from the plants.

rhizoid *rhizoïde* In the lower plants, one of the unicellular or multicellular rootlike filaments that serve for attachment and absorption.

rhizoplane *rhizoplan* The external surface of roots and of the soil particles and debris adhering to them.

rhizosphere *rhizosphère* The soil surrounding and directly influenced by plant roots.

rill *rigole* A narrow, very shallow, intermittent water course having steep sides. It presents no obstacle to tilling.

rill erosion *érosion en rigoles* See **erosion (ii).**

riverwash *batture* Barren, usually coarse-textured, alluvial soil in and along waterways, exposed at low water levels and subject to shifting during flood periods. A miscellaneous land type.

roche moutonnée *roche moutonnée* A rounded hummock (boss) of rock smoothed and striated by glacial action and often showing evidence of plucking on the lee side.

rock drumlin *drumlin à noyau rocheux, rocdrumlin* An elongated hill having a veneer of glacial drift over a rock core.

rockland *terrain rocheux* An area of which usually 25% to 90% is occupied by rock outcrops and most of the remainder by shallow soils. A miscellaneous land type.

rough broken land *terrain accidenté* An area having steep slopes and many intermittent drainage channels, but usually covered with vegetation. See also **miscellaneous land type.**

runoff *ruissellement* The portion of the total precipitation on an area that flows away through stream channels. Surface runoff does not enter the soil. Groundwater runoff or seepage flow from groundwater enters the soil before reaching the stream.

saline soil *sol salin* A nonalkali soil that contains enough soluble salts to interfere with the growth of most crop plants. The conductivity of the saturation extract is greater than 4 mmhos/cm, the exchangeable-sodium percentage is less than 15, and the pH is usually less than 8.5.

saline-alkali soil *sol salin à alcalis* (i) A soil containing enough exchangeable sodium to interfere with the growth of most crop plants, and containing appreciable quantities of soluble salts. The exchangeable-sodium percentage is greater than 15, the conductivity of the saturation extract is greater than 4 mmhos/cm at 25°C, and the pH is usually 8.5 or less in the saturated soil. (ii) A saline-alkali soil has a combination of harmful quantities of salts and either a high alkalinity or high content of exchangeable sodium, or both, so distributed in the profile that the growth of most crop plants is reduced. It is also called saline-sodic soil.

salinity, soil *salinité du sol* The amount of soluble salts in a soil, expressed in terms of percentage, parts per million, or other convenient ratios.

salinization *salinisation* The process of accumulation of salts in soil.

salt-affected soil *sol altéré par le sel* Soil that has been adversely modified for the growth of most crop plants by the presence of certain types of exchangeable ions or of soluble salts. It includes soils having an excess of salts, or an excess of exchangeable sodium, or both. See also **saline-alkali soil, saline soil,** and **sodic soil.**

sand *sable* (i) A soil particle between 0.05 and 2.0 mm in diameter. (ii) Any one of five soil separates: very coarse sand, coarse sand, medium sand, fine sand, or very fine sand. See also **separates, soil.** (iii) A soil textural class. See also **texture, soil.**

sandy *sableux* Containing a large amount of sand. It may be applied to any one of the soil classes that contains a large percentage of sand. See also **class, soil** and **texture, soil.**

sandy clay *argile sableuse* A soil textural class. See also **class, soil** and **texture, soil.**

sandy clay loam *loam sablo-argileux* A soil textural class. See also **class, soil** and **texture, soil.**

sandy loam *loam sableux* A soil textural class. See also **class, soil** and **texture, soil.**

saturate *saturer* (i) To fill all the voids between soil particles with a liquid. (ii) To form the most concentrated solution possible under a given set of physical conditions in the presence of an excess of the solute. (iii) To fill to capacity, as the adsorption complex with a cation species; for example, H-saturated.

saturation extract *extrait de saturation* The extract from a soil sample that has been saturated with water.

science, soil *science des sols* The science dealing with soil as a natural resource. It includes: soil formation, classification, and mapping; the physical, chemical, and biological properties of soils; and the management of soils for various purposes such as the production of agricultural and forest crops, the construction of roads, and others.

second bottom *terrasse inférieure, basse terrasse* The first terrace above the normal floodplain of a stream.

secondary mineral *minéral secondaire* A mineral resulting from the decomposition of a primary mineral or from the precipitation of the products of decomposition of a primary mineral. See also **primary mineral.**

sedimentary rock *roche sédimentaire* A rock formed from materials deposited from suspension or precipitated from solution and usually more or less consolidated. The principal sedimentary rocks are sandstones, shales, limestones, and conglomerates.

seepage *suintement* (i) The escape of water downward through the soil. (ii) The emergence of water from the soil along an extensive line of surface in contrast to a spring where the water emerges from a local spot.

self-mulching soil *sol à mulching spontané* A soil in which the surface layer becomes so well aggregated that it does not crust and seal under the impact of rain, but instead serves as a surface mulch when it dries.

sensitivity *sensibilité* The effect of remolding on the shear strength of an undrained cohesive soil.

separates, soil *fractions du sol* Mineral particles, less than 2.0 mm in equivalent diameter, ranging between specified size limits. The names and size limits of separates recognized by pedologists in Canada and the United States are: very coarse sand, 2.0 to 1.0 mm; coarse sand, 1.0 to 0.5 mm; medium sand, 0.5 to 0.25 mm; fine sand, 0.25 to 0.10 mm; very fine sand, 0.10 to 0.05 mm; silt, 0.05 to 0.002 mm; and clay, less than 0.002 mm. The separates recognized by the International Society of Soil Science are (I) coarse sand, 2.0 to 0.2 mm; (II) fine sand, 0.2 to 0.02 mm; (III) silt, 0.02 to 0.002 mm; and (IV) clay, less than 0.002 mm.

sequum *sequum* A sequence of an eluvial horizon and its related illuvial horizon in a soil.

serial dilution *suspension-dilution, dilution en série* Successive dilution of a specimen, for example, 1:10 dilution equals 1 ml of a specimen plus 9 ml of diluent (e.g., sterile water); 1:100 dilution equals 1 ml of a 1:10 dilution plus 9 ml of diluent.

series, soil *série de sols* A category in the Canadian system of soil classification. This is the basic unit of soil classification, and consists of soils that are essentially alike in all major profile characteristics except the texture of the surface.

shaly *schisteux, feuilleté* (i) Containing a large amount of shale fragments. (ii) A soil phase; for example, shaly phase. (iii) Kind of fragment; see **coarse fragments.**

shear stress *force de cisaillement* The force per unit area acting tangentially to a given plane within a soil mass.

sheet erosion *érosion en nappe* See **erosion** (ii).

silica-alumina ratio *rapport silice-alumine* The molecules of silicon dioxide (SiO_2) per molecule of aluminum oxide (Al_2O_3) in clay minerals or soils.

silica-sesquioxide ratio *rapport silice-sesquioxyde* The molecules of silicon dioxide (SiO_2) per molecule of aluminum oxide (Al_2O_3) plus ferric oxide (Fe_2O_3) in clay minerals or soils.

silt *limon* (i) A soil separate consisting of particles between 0.05 and 0.002 mm in equivalent diameter. See also **separates, soil.** (ii) A soil textural class. See also **texture, soil.**

silt loam *loam limoneux* A soil textural class. See also **texture, soil** and **class, soil.**

silting *envasement* The deposition of water-borne sediments in stream channels, lakes, reservoirs, or on floodplains, usually resulting from a decrease in the velocity of the water.

siltstone *grès fin, siltstone* A very fine grained, consolidated, clastic rock composed predominantly of particles of silt grade.

silty clay *argile limoneuse* A soil textural class. See also **texture, soil** and **class, soil.**

silty clay loam *loam limono-argileux* A soil textural class. See also **class, soil** and **texture, soil.**

single-grain structure *structure particulaire* A soil structure in which the soil particles occur almost completely as individual or primary particles; secondary particles or aggregates are

seldom present. It is usually found only in extremely coarse-textured soils.

site *station* (i) In ecology, an area described or defined by its biotic, climatic, and soil conditions in relation to its capacity to produce vegetation. (ii) An area sufficiently uniform in biotic, climatic, and soil conditions to produce a particular vegetation.

site index *indice de qualité de station* (i) A quantitative evaluation of the productivity of a soil for forest growth under the existing or specified environment. (ii) The height in feet of the dominant forest vegetation taken at or calculated to an index age, usually 50 or 100 years.

sixty-centimetre tension *tension à 60 centimètres* See **moisture tension, soil.**

slaking, soil *désagrégation* The breakdown of aggregates resulting from the addition of water to soil.

slaty *ardoisier(ière)* Containing a considerable quantity of slate fragments. It is used to modify soil texture class names, such as slaty clay loam. See also **coarse fragments.**

slick spots *taches lisses* Small areas in a field that are slick when wet, because of a high content of alkali or exchangeable sodium.

slickens *boue de mines fine* Fine-textured materials separated in placer mining and in ore-mill operations; the materials may be detrimental to plant growth and so should be confined in specially constructed basins. A miscellaneous land type.

slickenside *surface de glissement, miroir de faille* Smoothed surfaces along planes of weakness resulting from the movement of one mass of soil against another in soils dominated by swelling clays.

smectite *smectite* See **montmorillonite group.**

sodic soil *sol sodique* (i) A soil containing sufficient sodium to interfere with the growth of most crop plants. (ii) A soil having an exchangeable-sodium percentage of 15 or more.

soil *sol* (i) The unconsolidated material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. (ii) The naturally occurring unconsolidated material on the surface of the earth that has been influenced by parent material, climate (including the effects of moisture and temperature), macro- and micro-organisms, and relief, all acting over a period of time to produce soil that may differ from the material from which it was derived in many physical, chemical, mineralogical, biological, and morphological properties. (iii) For the purpose of the Canadian taxonomic system, the earth's surface (the material that is to be classified) is divided into soil and nonsoil. Soil is the naturally occurring, unconsolidated, mineral or organic material at the earth's surface that is capable of supporting plant growth. It extends from the surface to 15 cm (6 inches) below the depth at which properties produced by soil-forming processes can be detected. These properties differ from those found in any underlying unconsolidated material. The soil-forming processes are defined as an interaction between climate, living organisms, and relief acting on soil and soil parent material. Unconsolidated material includes material cemented or compacted by soil-forming processes. Soil may have water covering its surface to a depth of 60 cm (24 inches) or less in the driest part of the year. Nonsoil is the collection of soil material or soil-like material that does not meet the preceding definition of soil. It includes soil displaced by unnatural processes and unconsolidated material unaffected by soil-forming processes, except for the material that occurs within 15 cm (6 inches) below soil as defined. Nonsoil also includes unconsolidated mineral or organic material thinner than 10 cm (4 inches) overlying bedrock; organic material thinner than 40 cm (16 inches) overlying a hydric layer; and soil covered by more than 60 cm (24 inches) of water in the driest part of the year.

soil-formation factors *facteurs de formation du sol, facteurs pédogénétiques* The variable, usually interrelated natural agencies that are responsible for the formation of soil. The factors are: parent rock, climate, organisms, relief, and time.

soilclime *pédoclimat, climat du sol* The temperature and moisture conditions of the soil; the soil climate.

solifluction *solifluxion* A type of creep that takes place in regions where the ground freezes to a considerable depth and as it thaws during the warm seasons the upper thawed position creeps downhill over the frozen material. The soil moves as a viscous liquid down slopes of as little as 2 or 3 degrees and may carry rocks of considerable size in suspension.

Solod *solod* A great group of soils in the Solonetzic order occurring most commonly in the grassland and parkland regions. The soils have a dark-colored surface (Ah) horizon, a prominent eluvial (Ahe or Ae) horizon at least 5 cm (2 inches) thick, a prominent transitional (AB) horizon that breaks readily into blocky aggregates, and a darkly stained B (Bnt) horizon over a C horizon that is saline and usually calcareous.

solodized soil *sol solodisé* A soil that has been subjected to the processes responsible for the development of a Solod and has at least some of the characteristics of a Solod.

Solodized Solonetz *solonetz solodisé* A great group of soils in the Solonetzic order, occurring most commonly in the grassland and parkland regions and consisting of soils with a variable surface (Ah, Ahe, or Ae) horizon that is underlain by a well-developed Ae horizon, a compact prismatic or columnar Bnt horizon, and a C horizon that is saline and usually calcareous.

Solonetz *solonetz* A great group of soils in the Solonetzic order, occurring most commonly in the grassland and parkland regions and consisting of soils with a variable surface (Ah, Ahe, or Ae) horizon that breaks abruptly into a hard, compact prismatic or columnar B (Bnt, rarely a Bn) horizon underlain by one or more saline and usually calcareous (Bs, Cs, Csa, Csk, Cca) horizons. They lack a continuous Ae horizon 2.5 cm (1 inch) or more thick.

Solonetzic *solonetzique* An order of soils developed mainly under grass or grass-forest vegetative cover in semiarid to subhumid climates. The soils have a stained brownish solonetzic B (Bnt or Bn) horizon and a saline C horizon. The surface may be one or more of Ap, Ah, or Ae horizons. The order includes the Solonetz, Solodized Solonetz, and Solod great groups.

soluble-sodium percentage (SSP) *pourcentage de sodium soluble (PSS)* The proportion of sodium ions in solution in relation to the total cation concentration, defined as follows:

$$\text{SSP} = \frac{\text{soluble-sodium concentration (meq/litre)}}{\text{total cation concentration (meq/litre)}} \times 100.$$

solum (plural sola) *solum(s)* The upper horizons of a soil in which the parent material has been modified and in which most plant roots are contained. It usually consists of A and B horizons.

solution, soil *solution du sol* The aqueous liquid phase of the soil and its solutes consisting of ions dissociated from the surfaces of the soil particles and of other soluble materials.

Sombric Brunisol *brunisol sombrique* A great group of soils in the Brunisolic order. The soils have moder Ah horizons more than 5 cm (2 inches) thick and Bm horizons in which the base saturation (NaCl) is usually 65% to 100% and the pH ($CaCl_2$) is usually about 5.5.

splash erosion *érosion par éclaboussement* See **erosion (ii).**

spoil bank *remblai détritique* Rock waste, banks, and dumps, from the excavation of ditches.

sprinkler irrigation *irrigation par aspersion* See **irrigation methods.**

stabilization, soil *stabilisation du sol* Chemical or mechanical treatment designed to increase or maintain the stability of a mass of soil or otherwise to improve its engineering properties.

sterilization *stérilisation* The process of making sterile, the killing of all forms of life.

sticky point *point d'adhésion* (i) A condition of consistence at which the soil barely fails to stick to a foreign object. (ii) Specifically and numerically, the weight moisture percentage of a well-mixed, kneaded soil that barely fails to adhere to a polished nickel or stainless steel surface when the shearing speed is 5 cm/sec. The measurement is made rarely now.

Stokes' law *loi de Stokes* An equation relating the terminal settling velocity of a smooth, rigid sphere in a viscous fluid of known density and viscosity to the diameter of the sphere when subjected to a known force field. It is used in the particle-size analysis of soils by the pipette, hydrometer, or centrifuge methods. The equation is:

$$V = (2gr^2)(d_1 - d_2)/9\eta$$

where

V = velocity of fall (cm sec^{-1}),
g = acceleration of gravity (cm sec^{-2}),
r = "equivalent" radius of particle (cm),
d_1 = density of particle (g cm^{-3}),
d_2 = density of medium (g cm^{-3}), and
η = viscosity of medium (dyne sec cm^{-2}).

stones *pierres* Rock fragments greater than 25 cm (10 inches) in diameter if rounded and greater than 38 cm (15 inches) along the greater axis if flat. See also **coarse fragments.** In engineering practice these fragments are included with boulders, which are considered to be greater than 20 cm (8 inches) in diameter.

stoniness *pierrosité* The relative proportion of stones in or on the soil. This term is used in the classification of soils. See also **coarse fragments.**

stony *pierreux* Containing sufficient stones to interfere with or prevent tillage. To be classified as stony, more than 0.1% of the surface of the soil must be covered with stones. The term is used to modify soil class, as stony clay loam or clay loam, stony phase. See also **coarse fragments.**

stony land *terrain pierreux* Areas containing sufficient stones to make the use of machinery impractical; usually 15% to 90% of the surface soil is covered with stones. See also **stoniness.**

stratification *stratification* The arrangement of sediments in layers or strata marked by a change in color, texture, dimension of particles, and composition. Stratification usually means layers of sediments that separate readily along bedding planes because of different sizes and kinds of material or some interruption in deposition that permitted changes to take place before more material was deposited.

stratified drift (or sorted drift) *drift stratifié, drift trié* Materials that are distinctly sorted according to size and weight of their component fragments, indicating a medium of transport (water or wind) more fluid than glacier ice.

stratum (plural strata) *strate* A layer characterized by certain unifying characteristics, properties, or attributes distinguishing it from adjacent layers.

stress *stress* A directional force acting within a material.

strip cropping *culture en bandes* The practice of growing crops that require different types of tillage, such as row and sod, in alternate strips along contours or across the prevailing direction of wind.

structure classes, soil *classes structurales du sol* A grouping of soil structural units or peds on the basis of size. These are tabulated under **structure types, soil** (Table 3).

structure grades, soil *degrés d'agrégation du sol* A grouping or classification of soil structure on the basis of inter- and intra-aggregate adhesion, cohesion, or stability within the profile. Three grades of structure designated from 1 to 3 are:

1) *weak structure faible* poorly formed, indistinct peds, barely evident in place.
2) *moderate structure modérée* well-formed distinct peds, moderately durable and evident, but not distinct, in undisturbed soil.
3) *strong structure forte* durable peds that are quite evident in undisturbed soil, adhere weakly to one another, withstand displacement, and become separated when the soil is disturbed.

structure index *indice de structure* Any measurement of a soil physical property, such as aggregation, porosity, permeability to air or water, or bulk density, that denotes or indicates the structural condition of a soil.

structure, soil *structure du sol* The combination or arrangement of primary soil particles into secondary particles, units, or peds. These peds may be, but usually are not, arranged in the profile in such a manner as to give a distinctive characteristic pattern. The peds are characterized and classified on the basis of size, shape, and degree of distinctness into classes, types, and grades. See also **structure classes, soil; structure grades, soil;** and **structure types, soil.** These are defined and tabulated under **structure types, soil** (Table 3).

structure types, soil *types de structure du sol* A classification of soil structure based on the shape of the aggregates or peds and their arrangement in the profile (Table 3).

stubble mulch *paillis, mulch de chaume* The stubble of crops or crop residues left essentially in place on the land as a surface cover before and during the preparation of the seedbed and at least partly during the growing of a succeeding crop. Synonymous with trash cover.

subgroup, soil *sous-groupe de sols* A category in the Canadian classification system. These soils are subdivisions of the great groups and therefore each soil is defined more specifically.

subirrigation *irrigation souterraine* See **irrigation methods.**

subsoiling *sous-solage* The breaking of compact subsoils, without inverting them, with a special knifelike instrument (chisel), which is pulled through the soil usually at depths of 30 to 60 cm (12 to 24 inches) and spacings of 60 to 150 cm (2 to 5 ft). Also called chiseling.

substrate *substrat* (i) That which is laid or spread under; an underlying layer, such as the subsoil. (ii) The substance, base, or nutrient on which an organism grows. (iii) Compounds or substances that are acted upon by enzymes or catalysts and changed to other compounds in the chemical reaction.

subsurface tillage *travail du sous-sol* Tillage with a special sweeplike plow or blade, which is drawn beneath the surface at depths of several centimetres and cuts plant roots and loosens the soil without inverting it or incorporating the surface cover.

sulfofication *sulfofication* (Obsolete) The biological oxidation of sulfur and sulfur compounds in the soil.

summation curve (of particle sizes) *courbe de sommation (de dimensions des particules)* A curve showing the accumulative percentage by weight of particles within increasing or

Table 3. Soil structure

Type	Kind	Class	Size (mm)
1. Structureless—no observable aggregation or no definite orderly arrangement around natural lines of weakness.	A. Single grain—loose, incoherent mass of individual particles as in sands.		
	B. Amorphous (massive)—a coherent mass showing no evidence of any distinct arrangement of soil particles.		
2. Blocklike—soil particles arranged around a point and bounded by flat or rounded surfaces.	A. Blocky (angular blocky)—faces rectangular and flattened, vertices sharply angular.	Fine blocky	<10
		Medium blocky	10–20
		Coarse blocky	20–50
		Very coarse blocky	>50
	B. Subangular blocky—faces subrectangular, vertices mostly oblique, or subrounded.	Fine subangular blocky	<10
		Medium subangular blocky	10–20
		Coarse subangular blocky	20–50
		Very coarse subangular blocky	>50
	C. Granular-spheroidal—characterized by rounded vertices.	Fine granular	<2
		Medium granular	2–5
		Coarse granular	5–10
3. Platelike—soil particles arranged around a horizontal plane and generally bounded by relatively flat horizontal surfaces.	A. Platy—horizontal planes more or less developed.	Fine platy	<2
		Medium platy	2–5
		Coarse platy	>5
4. Prismlike—soil particles arranged around a vertical axis and bounded by relatively flat vertical surfaces.	A. Prismatic—vertical faces well defined and edges sharp.	Fine prismatic	<20
		Medium prismatic	20–50
		Coarse prismatic	50–100
		Very coarse prismatic	>100
	B. Columnar—vertical edges near top of columns not sharp. (Columns may be flat-topped, round-topped, or irregular).	Fine columnar	<20
		Medium columnar	20–50
		Coarse columnar	50–100
		Very coarse columnar	>100

decreasing size limits as a function of diameter; the percentage by weight of each size fraction is plotted accumulatively on the ordinate as a function of the total range of diameters represented in the sample plotted on the abscissa.

surface runoff *ruissellement de surface* See **runoff.**

surface sealing *imperméabilisation, obturation de surface* The orientation and packing of dispersed soil particles in the immediate surface layer of the soil to render the surface fairly impermeable to water.

surface soil *sol de surface* The uppermost part of the soil that is ordinarily moved in tillage, or its equivalent in uncultivated soils. It ranges in depth from 7.5 to 25 cm (3 to 10 inches) and is frequently designated as the "plow layer," the "Ap layer," or the "Ap horizon."

survey, soil *prospection pédologique, levé des sols* (Pedology) The systematic examination, description, classification, and mapping of soils in an area. Soil surveys are classified according to the kind and intensity of the field examination.

sustained yield *rendement soutenu* A continual annual, or periodic, yield of plants or plant material from an area; implies management practices that maintain the productive capacity of the land.

swamp *marécage* An area saturated with water throughout much of the year, but with the surface of the soil usually not deeply submerged. It is generally characterized by tree or shrub vegetation. See also **marsh** and **miscellaneous land type.**

symbiosis *symbiose* The living together in intimate association of two dissimilar organisms, so that the cohabitation is mutually beneficial.

symmetry concentration *concentration symétrique* The quantity of cations or anions equivalent to the exchange capacity of a soil. For example, if the cation exchange capacity of a soil is 10 meq/100 g of soil, then 1 symmetry concentration is 10 meq of any cation.

symmetry value *valeur symétrique* The percentage of the adsorbed ion released when one symmetry concentration of another ion is added.

synergism *synergie* The ability of two or more organisms to bring about changes (usually chemical) that neither can accomplish alone.

talud *talud* A short, steep slope formed gradually at the downslope margin of a field by deposition against a hedge, a stone wall, or other similar barrier.

talus *talus* A sloping heap of loose rock fragments lying at the foot of a cliff or steep slope.

taxon (plural taxa) *taxon(s)* A class at any categorical level of a taxonomic system of classification.

tensiometer *tensiomètre* A device for measuring the negative pressure, or tension, of water in soil in situ; a porous, permeable ceramic cup connected through a tube to a manometer or vacuum gauge.

terrace *terrasse* A nearly level, usually narrow, plain bordering a river, lake, or sea. Rivers sometimes are bordered by a number of terraces at different levels. There are also man-made terraces.

terric layer *couche terrique* An unconsolidated mineral substratum underlying organic soil material.

textural classification *classement textural* See **texture, soil.**

texture, soil *texture du sol* The relative proportions of the various soil separates in a soil as described by the classes of soil texture shown in Fig. 1. The names of textural soil classes may be modified by adding suitable adjectives when coarse fragments are present in substantial amounts; for example, "Gibraltar stony sandy loam," or "Saint-Jovite silt loam, stony phase." For other modifications see **coarse fragments.** The sand, loamy sand, and sandy loam are further subdivided on the basis of the proportions of the various sand separates present. The limits of the various classes and subclasses are:

sand sable Soil material that contains 85% or more sand; the percentage of silt plus 1.5 times the percentage of clay does not exceed 15.

coarse sand sable grossier 25% or more very coarse and coarse sand, and less than 50% any other one grade of sand.

sand sable 25% or more very coarse, coarse, and medium sand, and less than 50% fine or very fine sand.

fine sand sable fin 50% or more fine sand or less than 25% very coarse, coarse, and medium sand and less than 50% very fine sand.

very fine sand sable très fin 50% or more very fine sand.

loamy sand sable loameux Soil material that contains at the upper limit 85 to 90% sand, and the percentage of silt plus 1.5 times the percentage of clay is not less than 15; at the lower limit it contains not less than 70 to 85% sand, and the percentage of silt plus twice the perc ntage of clay does not exceed 30.

loamy coarse sand sable grossier loameı . 25% or more very coarse and coarse sand and le s than 50% any other one grade of sand.

loamy sand sable loameux 25% or more very coarse, coarse, and medium sand and less than 50% fine or very fine sand.

loamy fine sand sable fin loameux 50% or more fine sand or less than 25% very coarse, coarse, and medium sand and less than 50% very fine sand.

loamy very fine sand sable très fin loameux 50% or more very fine sand.

sandy loam loam sableux Soil material that contains either 20% or less clay, with a percentage of silt plus twice the percentage of clay that exceeds 30, and 52% or more sand; or less than 7% clay, less than 50% silt, and between 43% and 52% sand.

coarse sandy loam loam sableux grossier 25% or more very coarse and coarse sand and less than 50% any other one grade of sand.

sandy loam loam sableux 30% or more very coarse, coarse, and medium sand, but less than 25% very coarse sand, and less than 30% very fine or fine sand.

fine sandy loam loam sableux fin 30% or more fine sand and less than 30% very fine sand or between 15 and 30% very coarse, coarse, and medium sand.

very fine sandy loam loam sableux très fin 30% or more very fine sand or more than 40% fine and very fine sand, at least half of which is very fine sand, and less than 15% very coarse, coarse, and medium sand.

loam loam Soil material that contains 7 to 27% clay, 28 to 50% silt, and less than 52% sand.

silt loam loam limoneux Soil material that contains 50% or more silt and 12 to 27% clay, or 50 to 80% silt and less than 12% clay.

silt limon Soil material that contains 80% or more silt and less than 12% clay.

sandy clay loam loam sablo-argileux Soil material that contains 20 to 35% clay, less than 28% silt, and 45% or more sand.

clay loam loam argileux Soil material that contains 27 to 40% clay and 20 to 45% sand.

silty clay loam loam limono-argileux Soil material that contains 27 to 40% clay and less than 20% sand.

sandy clay argile sableuse Soil material that contains 35% or more clay and 45% or more sand.

silty clay argile limoneuse Soil material that contains 40% or more clay and 40% or more silt.

clay argile Soil material that contains 40% or more clay, less than 45% sand, and less than 40% silt.

heavy clay argile lourde Soil material that contains more than 60% clay.

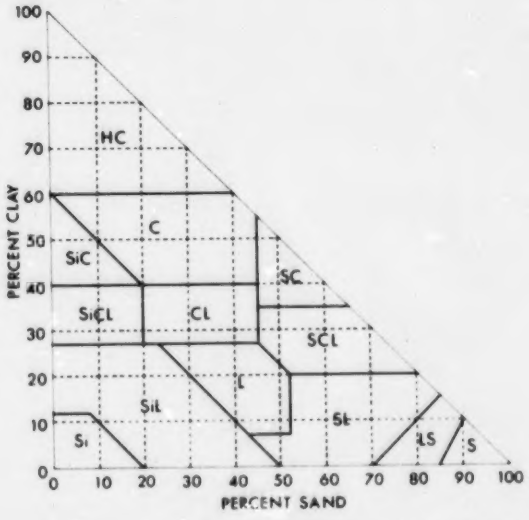

Fig. 1. Soil textural classes. Percentages of clay and sand in the main textural classes of soils; the remainder of each class is silt.

thermal analysis (or differential thermal analysis) *analyse thermique, analyse thermique différentielle* A method of analyzing a soil sample for constituents, based on the differential rate of heating of the unknown and standard samples when a uniform source of heat is applied.

thermal conductivity *conductibilité thermique* The rate of transfer of heat to or from a point in the soil.

thermogenic soils *sols thermogénétiques* Soils with properties that have been influenced primarily by high soil temperature

as the dominant soil-formation factor, developed in subtropical and equatorial regions.

thermophile *thermophile* An organism that grows best at temperatures of 50°C or higher.

thermosequence *thermoséquence* A sequence of related soils that differ, one from the other, primarily as a result of temperature as a soil-formation factor.

threshold moisture content *humidité critique, point de flétrissement* (Biology) The minimum moisture condition, measured in terms of either moisture content or moisture stress, at which biological activity just becomes measurable.

tidal flats *laisse de marée, slikke* Areas of nearly flat, barren mud periodically covered by tidal waters. Normally these materials have an excess of soluble salt. A miscellaneous land type.

tier *étage* A depth subdivision used in the classification of Organic soils.

surface tier *étage supérieur* The upper 40 cm (16 inches) of peat.

middle tier *étage intermédiaire* The tier just below the surface tier. It is 80 cm (32 inches) thick or extends to a lithic or hydric contact. The great group classification of Organic soils is usually based on this tier.

bottom tier *étage inférieur* The tier below the middle tier. It is 40 cm (16 inches) thick or extends to a lithic or hydric contact. The subgroup classification of Organic soils is based partly on this tier.

tight soil *sol compact, tenace* A compact, relatively impervious and tenacious soil or subsoil, which may or may not be plastic.

tile drain *drain souterrain, tuyau de drainage* Pipe placed at suitable depths and spacings in the soil or subsoil to provide water outlets from the soil. The pipe may be concrete, ceramic, fiber, plastic, or any other suitable material.

till *till* Unstratified glacial drift deposited directly by the ice and consisting of clay, sand, gravel, and boulders intermingled in any proportion.

till, to *cultiver le sol* To plow and prepare for seeding; to seed or cultivate the soil.

tillage *travail du sol* The operation, practice, or art of tilling land to improve it for agricultural purposes.

tilth *état d'ameublissement* The physical condition of soil as related to its ease of tillage, fitness as a seedbed, and impedance to seedling emergence and root penetration.

topography *topographie* The physical features of a district or region, such as those represented on a map, taken collectively; especially, the relief and contours of the land.

toposaic *photo-carte topographique* A photomap on which topographic or terrain-form lines are shown as on topographic quadrangles. See also **photomap** and **planisaic.**

toposequence *toposéquence* A sequence of related soils that differ, one from the other, primarily because of topography as a soil-formation factor. See also **clinosequence.**

topsoil *couche arable* (i) The layer of soil moved in cultivation. See also **surface soil.** (ii) The A horizon. (iii) The Ah horizon. (iv) Presumably fertile soil material used to topdress roadbanks, gardens, and lawns.

total potential (of soil water) *potentiel total (de l'eau du sol)* See **water, soil.**

total pressure *pression totale* See **water, soil.**

trace element *élément trace* (Obsolete) See **micronutrient.**

traffic pan *pan de trafic* See **pressure or induced pan.**

transitional soil *sol de transition* A soil with properties intermediate between those of two different soils and genetically related to them. See also **intergrade, soil.**

truncated *tronqué* Having lost all or part of the upper soil horizon or horizons.

tuff *tuf* Volcanic ash usually more or less stratified and in various states of consolidation.

tundra *toundra* A level or undulating treeless plain characteristic of arctic regions.

tundra soil *sol de toundra* Any soil in the tundra region.

type, soil *type de sol* (i) A unit in the natural system of soil classification; a subdivision of a soil series consisting of or describing soils that are alike in all characteristics including the texture of the A horizon. (ii) In Europe, the term is roughly equivalent to a great soil group.

underground runoff (or seepage) *écoulement souterrain* Water flowing toward stream channels after infiltration into the ground.

undifferentiated soil map unit *unité cartographique de sols non différenciés* Soil mapping unit in which two or more soil units occur, but not in a regular geographic association. For example, the steep phases of two or more soils might be shown as a unit on a map because slope is the prime characteristic. See also **association, soil** and **complex, soil.**

unsaturated flow *écoulement à non-saturation* The movement of water in a soil that is not filled to capacity with water.

upper plastic limit *limite supérieure de plasticité* See **liquid limit.**

urban land *terrain urbain* Areas so altered or obstructed by urban works or structures that identification of soils is not feasible. A miscellaneous land type.

valley train *trainée fluvio-glaciaire de vallée* An outwash terrace extending down a valley away from the ice front.

value, color *luminosité, intensité, brillance* The relative lightness of color, which is approximately a function of the square root of the total amount of light. See also **Munsell color system, hue,** and **chroma.**

variant, soil *variante du sol* A soil whose properties are believed to be sufficiently different from other known soils to justify a new series name, but comprising such a limited geographic area that creation of a new series is not justified.

varve *varve* A distinct band representing the annual deposit of sedimentary materials, regardless of origin. It usually consists of two layers, a thick light-colored layer of silt and fine sand laid down in the spring and summer, and a thin, dark-colored layer of clay laid down in the fall and winter. Because low temperatures are important in delaying the settling of the clay particles, it is assumed that varve formation can occur only with glacial waters. The salts of seawater prevent the formation of varves of this kind. The electrolytes in seawater cause flocculation, resulting in a homogeneous mass.

vermiculite group *groupe de la vermiculite* A group of hydrous platy clay minerals similar to the smectite group, but having a higher net permanent charge and often larger particle size.

vertical zonation *zones d'altitude, zonalité verticale* Altitudinal zonation of soils. See also **latitude zonation.**

very coarse sand *sable très grossier* See **separates, soil** and **texture, soil.**

very fine sand *sable très fin* See **separates, soil** and **texture, soil.**

very fine sandy loam *loam sableux très fin* See **texture, soil.**

void *pore* Space in a soil mass not occupied by solid mineral matter. This space may be occupied by air, water, or other gaseous or liquid material.

void ratio *indice des pores, des vides* The ratio of the volume of void space to the volume of solid particles in a given soil mass.

volume weight *poids volumétrique* (Obsolete) See **bulk density.**

W

wasteland *terrain inutilisable* Land not suitable for, or capable of, producing materials or services of value. A miscellaneous land type.

water, soil *eau du sol* Soil water is understood to be the equilibrium solution in the soil; pure water refers to the chemically pure compound H_2O. Water in soil is subject to several force fields originating from the presence of the soil solid phase, the dissolved salts, the action of external gas pressure, and the gravitational field. These effects may be quantitatively expressed by assigning an individual component potential to each (below and Table 4). The sum of these potentials is called the total potential of soil water.

total potential of soil water potentiel total de l'eau du sol The amount of work that must be done per unit quantity of pure water in order to transport reversibly and isothermally an infinitesimal quantity of water from a pool of pure water, at a specified elevation and at atmospheric pressure, to the soil water at the point under consideration. The total potential of soil water consists of:

osmotic potential potentiel osmotique The amount of work that must be done per unit quantity of pure water in order to transport reversibly and isothermally an infinitesimal quantity of water from a pool of pure water, at a specified elevation and at atmospheric pressure, to a pool of water identical in composition with the soil water at the point under consideration, but in all other respects being identical with the reference pool.

gravitational potential potentiel de gravité The amount of work that must be done per unit quantity of pure water in order to transport reversibly and isothermally an infinitesimal quantity of water, identical in composition with the soil water, from a pool at a specified elevation and at atmospheric pressure, to a similar pool at the elevation of the point under consideration.

matric potential (capillary potential) potentiel capillaire, de matrice The amount of work that must be done per unit quantity of pure water in order to transport reversibly and isothermally an infinitesimal quantity of water, identical in composition with the soil water, from a pool at the elevation and the external gas pressure of the point under consideration, to the soil water.

gas pressure potential potentiel à la pression extérieure des gaz This potential component is to be considered only when external gas pressure differs from atmospheric pressure as in a pressure membrane apparatus. A specific term and definition are not given.

water pressure, soil tension (pression) de l'eau du sol The pressure (positive or negative), in relation to the external gas pressure on the soil water, to which a solution identical in composition with the soil water must be subjected in order to be in equilibrium through a porous permeable wall with the soil water. It may be identified with the matric potential defined above.

osmotic pressure pression osmotique The pressure to which a pool of water, identical in composition with the soil water, must be subjected in order to be in equilibrium, through a semipermeable membrane, with a pool of pure water (semipermeable means permeable only to water). It may be identified with the osmotic potential defined above.

total pressure pression totale The pressure (positive or negative), in relation to the external gas pressure on the soil water, to which a pool of pure water must be subjected in order to be in equilibrium through a semipermeable membrane with the soil water. Total pressure is therefore equal to the sum of soil water pressure and osmotic pressure. Total pressure may also be derived from the measurement of the partial pressure of the water vapor in equilibrium with the soil water. It may be identified with the total potential defined above when gravitational and external gas pressure potentials can be neglected.

hydraulic head charge hydraulique The elevation with respect to a specified reference level at which water stands in a piezometer connected to the point in question in the soil. Its definition can be extended to soil above the water table if the piezometer is replaced by a tensiometer. The hydraulic head in systems under atmospheric pressure may be identified with a potential expressed in terms of the height of a water column. More specifically, it can be identified with the sum of gravitational and matric potentials and may be called the hydraulic potential.

water content teneur en eau The amount of water lost from the soil when it is dried to constant weight at 105°C; expressed either as the weight of water per unit weight of dry soil or as the volume of water per unit bulk volume of soil. The relationship between water content and soil water pressure is called the soil moisture retention curve, or sometimes the soil water (moisture) characteristic. Depending upon whether the curve is determined with decreasing or increasing water content, it is a desorption or adsorption curve respectively.

differential water capacity capacité différentielle de rétention d'eau The absolute value of the rate of change of water content with soil water pressure. The water capacity at a given water content will depend on the particular desorption or adsorption curve used. Distinction should be made between volumetric and specific water capacity.

Experimentally it has been established that generally the flow of a fluid in a porous medium can be described by Darcy's law, which states that the flux of fluid is proportional to the driving force. In viscous flow of water in soils, the driving force equals the negative gradient of the hydraulic potential.

hydraulic conductivity conductivité hydraulique The proportionality factor in Darcy's law as applied to the viscous flow of water in soil, that is, the flux of water per unit gradient of the hydraulic potential. If conditions require that the viscosity of the fluid be separated from the conductivity of the medium, it is convenient to define the permeability (or intrinsic permeability) of the soil as the conductivity (expressed in g^{-1} cm^3 sec) multiplied by the viscosity (in poises). For the purpose of solving the partial differential equation of the nonsteady-state flow in unsaturated soil it is often convenient to introduce a variable called the soil water diffusivity.

soil water diffusivity capacité de diffusion de l'eau dans le sol The hydraulic conductivity divided by the differential water capacity (using consistent units), or the flux of water per unit gradient of moisture content in the absence of other force fields.

water table (groundwater surface; free water surface; groundwater elevation) *nappe phréatique, niveau phréatique, niveau hydrostatique* Elevation at which the pressure in the water is zero with respect to the atmospheric pressure. See also **perched water table.**

waterlogged *engorgé* Saturated with water.

water-retention curve *courbe de rétention d'eau* **See moisture-retention curve.**

water-stable aggregate *agrégat stable à l'eau* A soil aggregate that is stable to the action of water, such as falling drops or agitation as in wet-sieving analysis.

weathering *altération* The physical and chemical disintegration, alteration, and decomposition of rocks and minerals at or near the earth's surface by atmospheric agents.

wild flooding *irrigation par submersion* **See irrigation methods.**

wild land *terrain en friche, friche* Uncultivated land. It may or

Table 4. Soil water

Term	*Symbol*[a]	*Dimension*	*Unit*
Total potential	ψ	L^2T^{-2}	erg g^{-1}, joule kg^{-1}
Osmotic potential	O	L^2T^{-2}	erg g^{-1}, joule kg^{-1}
Gravitational potential	Z	L^2T^{-2}	erg g^{-1}, joule kg^{-1}
Matric potential	M	L^2T^{-2}	erg g^{-1}, joule kg^{-1}
Soil water pressure		$ML^{-1}T^{-2}$	dyne cm^{-2}, bar, cm water, cm Hg
Osmotic pressure		$ML^{-1}T^{-1}$	dyne cm^{-2}, bar, cm water, cm Hg
Total pressure		$ML^{-1}T^{-2}$	dyne cm^{-2}, bar, cm water, cm Hg
Hydraulic head	H	L	cm, m
Hydraulic potential	ϕ	L^2T^{-2}	erg g^{-1}, joule kg^{-1}
Water content	w		$cm^3\ cm^{-3}$, $g\ g^{-1}$
Differential water capacity	C	$M^{-1}LT^2$	cm^{-2} dyne $^{-1}$, bar $^{-1}$
Hydraulic conductivity	K	[b]	[b]
Permeability	k	L^2	cm^2, Darcy
Soil water diffusivity	D	L^2T^{-1}	$cm^2\ sec^{-1}$

[a] Symbols such as ψ, K, and D may have w or h as a subscript if in the same paper they are used for water as well as for heat.

[b] The dimension depends on the units used to describe the driving force, as in the following table.

Driving force	*Dimension*	*Hydraulic conductivity*	
		Dimension	*Unit*
Hydraulic potential gradient	LT^{-2}	T	sec
Hydraulic head gradient	LL^{-1}	LT^{-1}	cm sec^{-1}
Pressure gradient	$ML^{-2}T^{-2}$	$M^{-1}L^3T$	$g^{-1}\ cm^3\ sec$

may not be maintained by the owner for its productive vegetative cover or for wood, forage production, recreation, or wildlife.

wilting coefficient *coefficient de flétrissement* (Obsolete) A calculated value of the approximate wilting point or permanent wilting percentage. Calculated as follows:

wilting coefficient = hygroscopic coefficient/0.68, or,
wilting coefficient = moisture equivalent/1.84

wilting point (permanent wilting point) *point de flétrissement* The moisture content of a soil at which plants (specifically sunflower plants) wilt and fail to recover their turgidity when placed in a dark, humid atmosphere. The wilting point is commonly estimated by measuring the 15-bar percentage of a soil.

windbreak *brise-vent, coupe-vent* A planting of trees, shrubs, or other vegetation, usually perpendicular or nearly so to the principal wind direction, to protect such things as soil, crops, homesteads, and roads against the effects of winds, such as wind erosion and the drifting of soil and snow.

X,Y,Z

xerophytes *xérophytes* Plants that grow in or on extremely dry soils or soil materials.

young soil *présol, sol en formation* Soil beginning to form.

zeta potential *potentiel zêta* See **electrokinetic potential.**

zonal soil *sol zonal* Any one of the great groups of soils having well-developed soil characteristics that reflect the zonal influence of climate and living organisms, mainly vegetation, as active factors of soil genesis. The zonal great soil group was the name of a former taxon that was similar to the present Canadian concept of the great group, for example, Gray Brown Luvisol.

zone, soil *zone de sols* Area in which the dominant or zonal soils reflect the zonal influence of climate and vegetation, and form a natural land pattern with other soils that exhibit the zonal influence only weakly or not at all. The soil zone is not a taxonomic unit, but may be used as a cartographic unit.

zymogenous flora *flore zymogène* Organisms found in soils in large numbers immediately after the addition of readily decomposable organic materials.

CONVERSION FACTORS FOR METRIC SYSTEM

Imperial units	Approximate conversion factor	Results in:	
LINEAR			
inch	x 25	millimetre	(mm)
foot	x 30	centimetre	(cm)
yard	x 0.9	metre	(m)
mile	x 1.6	kilometre	(km)
AREA			
square inch	x 6.5	square centimetre	(cm^2)
square foot	x 0.09	square metre	(m^2)
acre	x 0.40	hectare	(ha)
VOLUME			
cubic inch	x 16	cubic centimetre	(cm^3)
cubic foot	x 28	cubic decimetre	(dm^3)
cubic yard	x 0.8	cubic metre	(m^3)
fluid ounce	x 28	millilitre	(ml)
pint	x 0.57	litre	(ℓ)
quart	x 1.1	litre	(ℓ)
gallon	x 4.5	litre	(ℓ)
bushel	x 0.36	hectolitre	(hl)
WEIGHT			
ounce	x 28	gram	(g)
pound	x 0.45	kilogram	(kg)
short ton (2000 lb)	x 0.9	tonne	(t)
TEMPERATURE			
degrees Fahrenheit	(°F-32) x 0.56 or (°F-32) x 5/9	degrees Celsius	(°C)
PRESSURE			
pounds per square inch	x 6.9	kilopascal	(kPa)
POWER			
horsepower	x 746	watt	(W)
	x 0.75	kilowatt	(kW)
SPEED			
feet per second	x 0.30	metres per second	(m/s)
miles per hour	x 1.6	kilometres per hour	(km/h)
AGRICULTURE			
bushels per acre	x 0.90	hectolitres per hectare	(hl/ha)
gallons per acre	x 11.23	litres per hectare	(ℓ/ha)
quarts per acre	x 2.8	litres per hectare	(ℓ/ha)
pints per acre	x 1.4	litres per hectare	(ℓ/ha)
fluid ounces per acre	x 70	millilitres per hectare	(ml/ha)
tons per acre	x 2.24	tonnes per hectare	(t/ha)
pounds per acre	x 1.12	kilograms per hectare	(kg/ha)
ounces per acre	x 70	grams per hectare	(g/ha)
plants per acre	x 2.47	plants per hectare	(plants/ha)

Examples: 2 miles x 1.6 = 3.2 km; 15 bu/ac x 0.90 = 13.5 hl/ha